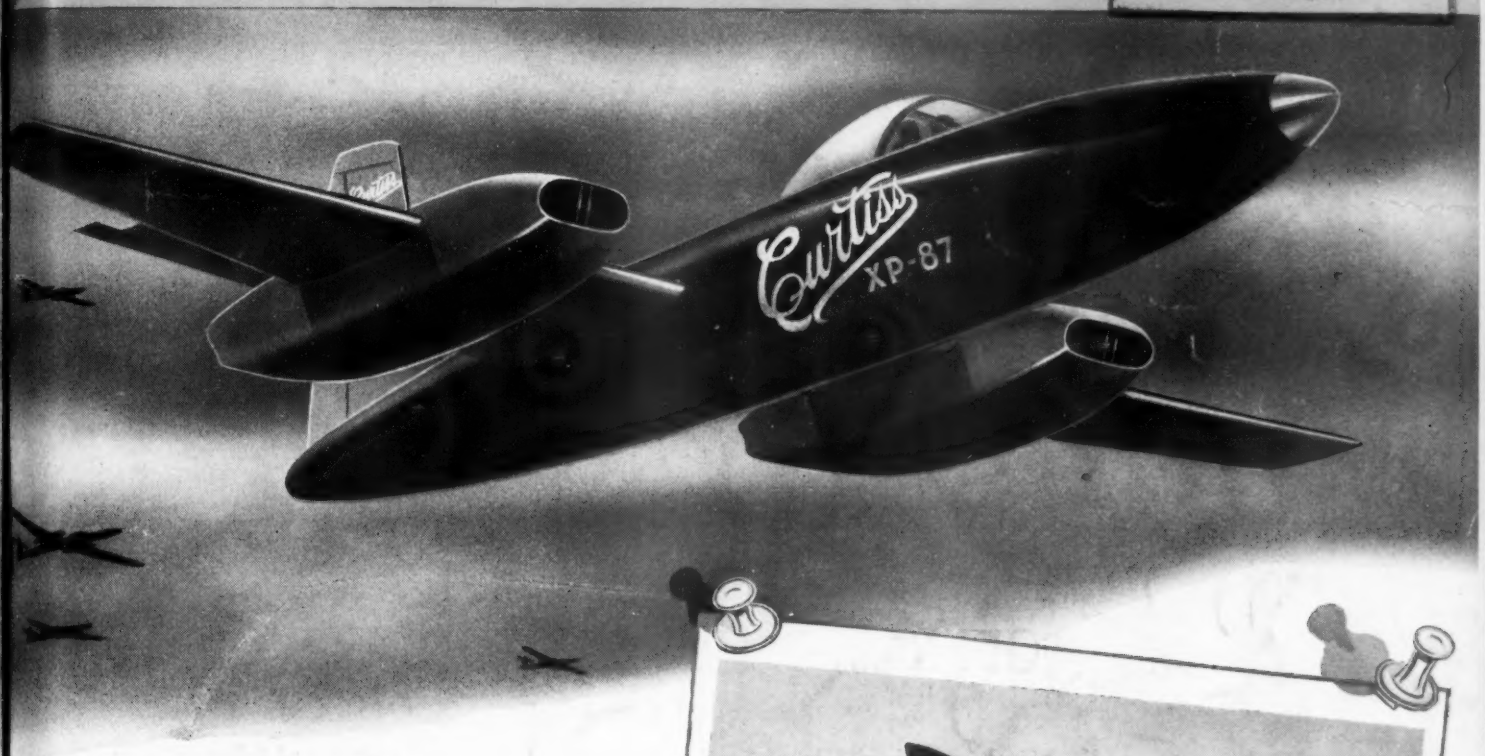
CHNOLOGY DEPARTMENT

AVIATION WEEK

A McGRAW-HILL PUBLICATION

FEB. 16, 1948

PUBLIC LIBRARY
FEB 16 1948
DETROIT



30 Years of *getting there* first

▸ The Curtiss-Wright XP-87—*first* four-engine jet propelled fighter of the U. S. Air Force—now joins the Curtiss S-3—*first* fighter plane of American military aviation—in the album of famous Curtiss "firsts."

▸ The XP-87 reflects the engineering pioneering and research behind the foremost leadership in the aviation industry—just as the S-3 did thirty years ago.

▸ The contrast in size, speed and range between the S-3 of 1917 and the XP-87 of today shows what Curtiss-Wright research and engineering mean to modern airplane development.

FIRST IN FLIGHT

CURTISS-WRIGHT

Airplane Division

COLUMBUS, OHIO

DEVELOPING

MEET

DETROIT PUB LIBRARY
TECHNOLOGY DPT
96 PUTNAM AV
DETROIT MICH

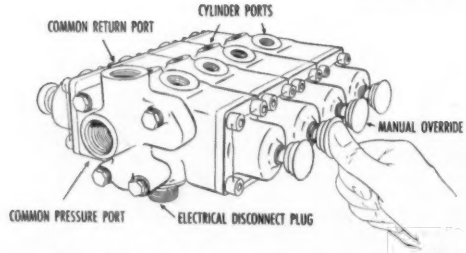
3000 PSI

BENDIX PACIFIC SOLENOID OPERATED HYDRAULIC 4-WAY VALVE

Here is the latest, fastest acting Bendix-Pacific remotely operated Selector Valve . . . currently being supplied for one of the newest Air Force pursuit airplanes. It is a slide-type 4-way valve available for both 1500 and 3000 PSI systems for either ⅜" or ½" tube sizes. It is pilot actuated, solenoid operated with direct manual override.

Any number of the valves can be stacked for multiple operation, all of them using a common pressure and return line. The valves also can be supplied with cylinder ports open or closed to return when valve is in neutral.

The valve operates on 18 to 28 volts direct current and the coil is energized *only* during the actual operating cycle. Weight of the entire valve is 4 pounds 11 ounces. Detailed specifications on the new valve are available on request.



IMPORTANT SPACE SAVINGS AND SIMPLIFIED PLUMBING RESULT FROM STACKING VALVES FOR MULTIPLE SERVICES

Pacific Division
Bendix Aviation Corporation
NORTH HOLLYWOOD, CALIF.

PRODUCT OF Bendix AVIATION CORPORATION

East Coast Offices: 475 Fifth Ave., New York 17, N.Y.
***Canadian Distributor*: Aviation Electric Ltd., Montreal**

Quick KNOCKOUT BLOW for cabin fires!

Here's a *Kidde-designed* airplane-cabin extinguisher that weighs *less than 7 pounds* . . . holds *more than a quart* of anti-freeze water solution. Needs no laborious pumping. Light enough for a stewardess to use easily with one hand. Good for operation down to —40°F!

A twist of the handle punctures a sealed cartridge of carbon dioxide (CO_2) . . . readies this powerful, *non-toxic* propellant to drive the water stream. Then press the release with the thumb . . . and a penetrating stream quickly kills fires in seat cushions, blankets, paper, other carbonaceous materials.

Extinguisher is easily recharged with plain water during flight. No special tools or other equipment needed . . . just carry a couple of small spare cartridges of CO_2.

Light, compact, sure in action, here's the ideal extinguisher for airplane cabins. Lightweight brackets are available. Get the full facts today!

This use of CO_2 as the propellant for a water stream is but one of the many ways in which Kidde has harnessed the energy of gases-under-pressure to make flying safer. Kidde engineers are always ready to work with government agencies, aircraft manufacturers and transport companies in developing new applications of gases-under-pressure—or new equipment to utilize the gases more effectively.

Kidde

SPECIALISTS IN GASES-UNDER-PRESSURE

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Walter Kidde & Company, Inc., 218 Main Street, Belleville 9, N. J.

with

LOCK-CLAD

aircord

LOAD APPLICATION causes almost no stretch in Roebling Lock-Clad Aircord . . . the swaged duralumin tubing compresses the steel cord and boosts its AE value. More than that, this combination of metals virtually synchronizes the thermal expansion and contraction of control cords to the dural airframe. Lock-Clad Aircord thus gives more uniform control, fewer take-up adjustments.

Roebling Lock-Clad Aircord is also ideal on pressurized-cabin planes where control sections pass through pressure seals. The cable's round, smooth surface means a snug, secure fit at all times.

Write for your copy of Catalog A-902 describing the full line of Roebling aircraft products.

AIRCORD DIVISION
JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

JR ROEBLING

ROEBLING
A CENTURY OF CONFIDENCE

Vol. 48 No. 7

AVIATION WEEK

Feb. 16, 1948

News Sidelights	7	New Aviation Products	24
Headline News	9	Sales & Service	27
News Digest	12	Briefing for Dealers	29
Aviation Calendar	13	Financial	30
Industry Observer	13	World News	31
Letters	14	Transport	34
Engineering-Production	15	Editorial	42

Robert H. Wood
EDITOR

Merlin H. Mickel
MANAGING EDITOR

Robert B. Hotz.....News Editor
Irving Stone.....Technical Editor
William Kroger.....Manufacturing
Alexander McSurely.....Sales & Service
Charles L. Adams.....Transport Editor
Robert McLarren.....Engineering
Albert E. Smyser, Jr.....Engineering
Scholer Bangs.....Pacific Coast Editor
Katherine Johnsen.....Congress
Stanley L. Colbert.....Production Editor
Marie Adams.....Editorial Assistant
Victoria Giaculli.....Editorial Makeup

Executive and Editorial Offices: 330 W. 42nd St., New York 18, N. Y.; National Press Bldg., Washington 4, D. C.

Domestic News Bureau: Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, Salt Lake City, Wichita and 43 other cities.

Foreign News Bureau: London, Paris, Berlin, Moscow, Tokyo, Bombay, Melbourne, Rio de Janeiro, Buenos Aires. Correspondents in Athens, Caracas, Santiago, Shanghai, Zurich, Rome, Johannesburg and over 40 other cities.

ECONOMIC STAFF
Dexter M. Keezer, Sanford S. Parker, William F. Butler, John D. Wilson

Robert F. Boger
PUBLISHER

J. C. Anthony
MANAGER

Business Manager, J. G. Johnson — *Research,* W. D. Lanier

R. W. Martin, Jr., *Sales Manager;* M. J. Storz, New York; L. J. Biel, Philadelphia; V. K. Dissette, Cleveland; A. B. Martin, Chicago; W. G. Ashmore, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Detroit, St. Louis, Boston and London.

Member of Associated Business Papers, Inc., and the Audit Bureau of Circulations

McGRAW-HILL PUBLISHING CO., Inc., Publishing Office, 99-129 N. Broadway, Albany, N. Y. Return postage guaranteed. Editorial and executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes-Haverty Bldg., Atlanta; 3; 621 S. Hope St., Los Angeles 14; 738-9 Oliver Bldg., Pittsburgh 22. JAMES H. McGRAW, Founder and Honorary Chairman; JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to President; J. E. BLACKBURN, Jr., Director of Circulation . . . Aviation Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $5 a year, $8 for 2 yr., $10 for 3 yr. Canada, $6 for 1 yr., $10 for 2 yr., $12 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 48, Number 7. Printed in U.S.A. Cable address "McGraw-Hill New York". Member A.B.C. Copyright 1948, McGraw-Hill Publishing Co. Aviation Week is indexed in "Reader's Guide to Periodical Literature" and in "Industrial Arts Index." Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

One of the toughest glazing problems ever encountered was the windshield of the Shooting Star. It was solved by "Pittsburgh" specialists, with the flat center panel of bird resisting, bullet resisting Pittsburgh Safety Plate Glass.

Safety Glass

BY "PITTSBURGH"

MANY new problems concerning airplane glass and glazing are being solved by the Pittsburgh Plate Glass Company.

At jet-propelled speeds, windshields are subject to greatly increased pressure, and air friction causes exceptionally high temperatures. Proof that "Pittsburgh" is meeting the new requirements lies in the fact that most military and large commercial planes now being produced have Safety Plate Glass windshields produced by Pittsburgh Plate Glass Company.

"Pittsburgh" is continuing an aggressive policy of product development, applying proved engineering principles to the solution of new problems as they arise. We are now supplying the aviation industry with laminated transparent plastics, photographic glasses for aerial use and precision ground bullet resistant glass for gunsight purposes.

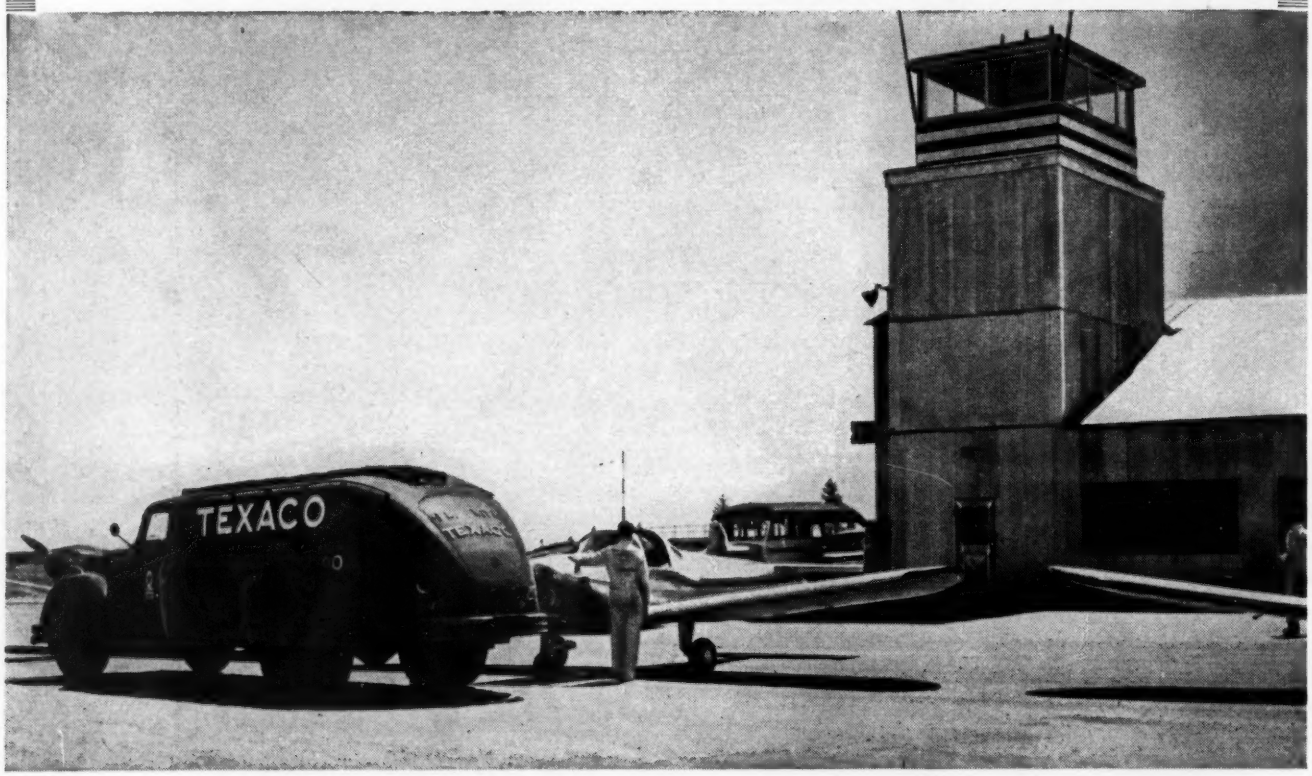
When you need Safety Glass for airplanes, bring your problems to "Pittsburgh." Our unceasing research, unexcelled equipment and years of experience in making quality glass are your assurance of satisfaction. Pittsburgh Plate Glass Company, 2091-8 Grant Building, Pittsburgh 19, Pennsylvania.

PPG

PAINTS · GLASS · CHEMICALS · BRUSHES · PLASTICS

PITTSBURGH PLATE GLASS COMPANY

MAKE YOURS A BUSIER AIRPORT



Take advantage of Texaco's many practical suggestions to make your airport successful

Two things will bring fliers to your airport . . . the reliability of your service, the quality of your products. Talk to a Texaco Aviation Representative. He'll gladly give you pointers on airport practice . . . and show you how Texaco Aviation Products can build business for you.

Texaco has aviation's most complete line of airframe and engine lubricants and fuels . . . more that meet A-N specifications than any other brand. Successful airports rely on the dependable, always uniform quality of Texaco products . . . as do leading engine and aircraft manufacturers and major airlines . . . coast to coast. In fact —

More revenue airline miles in the U.S. are flown with Texaco Aircraft Engine Oil than with any other brand.

Put this nation-wide preference for Texaco to work for you. Call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, *Aviation Division,* 135 East 42nd Street, New York 17, N. Y.

TEXACO Lubricants and Fuels
FOR THE AVIATION INDUSTRY

TUNE IN . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Wednesday night. • METROPOLITAN OPERA broadcasts every Saturday afternoon.

NEWS SIDELIGHTS

Bad News for Non-Scheds

CAB Safety Bureau is working behind locked doors on an extensive revision of air carrier safety regulations with major emphasis on bringing non-scheduled carriers up to scheduled airline requirements.

Newest CAA Names

Latest candidates for CAA administrator post soon to be vacated by T. P. Wright are Del Rentzel, president of Aeronautical Radio, Inc., and Stanley W. Bobskill, counsel for CAA's first region in New York.

Rentzel has strong airline backing and is an outstanding technical man, particularly in field of navigational aids. Bobskill is a Harvard law school graduate, a private pilot, with six years' service in CAA. His support comes from some Capitol Hill legislators interested in aviation. Meanwhile Deputy CAA Administrator Fred Lee is still strongly in the running.

Congress More Tolerant

Vacancy situation on CAB is having a wholesome effect on Congress' attitude toward the Board. Congressmen who last year heaped unreasonable criticism on the Board are now thinking and talking along corrective lines. Several floor speeches have been made calling for a boost in CAB salaries from $10,000 to $12,000 a year to stimulate morale and attract high-caliber personnel.

Rep. Karl Steffan (R., Neb.), chairman of the Commerce Department Appropriations subcommittee now holding closed sessions on the coming-year CAB budget, indicates that his group will at least "consider" the salary boost. Also indicative of Congressional apprehension over CAB deterioration was legislation introduced by Rep. Mendel Rivers (D., S. C.) barring the Board from rendering decisions until vacancies have been filled.

Report Stirs Committee

Heated wrangling is under way between Republican and Democratic members of the Senate War Investigating Committee over recommendations to be made in the group's final report.

Biggest controversy concerns handling of the investigation into Howard Hughes' $40 million wartime aircraft contracts, raising the hot political issues of (1) whether Elliott Roosevelt's pressure was largely responsible for the awards and (2) whether the investigation was retribution by Maine's GOP Sen. Brewster, chairman of the committee, for Hughes' alleged refusal to merge TWA with PAA and support the Senator's chosen instrument bill.

Republican committeemen are anxious to submit a report acceptable to Democratic members to forestall a minority report giving new publicity to Hughes' case against Brewster. Senate has extended time for the committee to file the report, due Jan. 31. It will contain sections dealing with the investigation of Maj. Gen. Bennett Meyers and failures in war mobilization.

Brewster vs. Hughes

Owen Brewster has put Howard Hughes on the spot.

The GOP Senator has formally notified Justice Dept. he wants a thorough investigation made of Hughes' "blackmail" charge against him—if Hughes requests it by filing a complaint making the charge.

In his published articles last summer alleging that Brewster attempted to use his political position to club him into a merger of TWA with Pan Am, Hughes stated he would file such a complaint.

In a transcontinental telephone conversation, Irving Kaufman, assistant to the Attorney General, invited the planemaker to move ahead with the complaint, but Hughes has not budged on the matter.

Phelps to NAA Post?

Bob Phelps may succeed Lowell Swenson as executive vice president of the National Aeronautic Association. Bob has managed so many NAA special conferences, meetings and events he has come to personify NAA in the minds of thousands of its members. "Call in Bob Phelps" has become a by-word in the aviation fraternity when the question of a ticket, a hotel reservation or an important upcoming date arises. From his long background of vital "behind the scenes" organization and management, Phelps is expected to emerge into the limelight of the director's job.

Landis—ALPA

If National Airlines goes through with its $5,000,000 libel and slander suit against the Air Line Pilots Association, former CAB Chairman James H. Landis may be found waging the union's legal battle.

Did Smilin' Jack Do It?

Wright Field and high military officers in Washington, after years of delay, are attempting to hang a security iron curtain around the nation's No. 1 experimental flight center on the Mojave desert, Muroc Air Base. No one, not even military officers, now can gain admission to Muroc without specific permission from Wright Field. Until recently both military personnel, at commissioned officer levels, and vendor representatives involved in servicing equipment aboard new super-hush aircraft, had little difficulty in coming and going from the air base.

The move is admirable in a national effort to stop military information leaks at a key source. Intelligence officers now are investigating closely, at leak points, desert resort spots that provide relaxation to Muroc personnel on week-ends. Military personnel at Muroc are believed to have received stern warning against discussing flight projects while off the base, particularly in groups visiting recreation centers and their bars. This action came about one month after cartoonist Zack Moseley depicted in his comic strip, "Smilin' Jack," how supersonic secrets were obtained by spy ring through pilots' loose talk during relaxing week-ends.

Bargain Hunters Lose Interest

Even cut-rate passenger lines feel the effects of a crash. U. S.-Puerto Rico passenger traffic via uncertificated carriers slumped sharply following the recent Coastal Air Lines accident at Savannah, Ga.

'You Can't Fire Us'

Several of the 39 uncertificated carriers warned this month to file proper reports with CAB or face suspension have been out of business for some time.

More Non-Sched Penalties

Now in the mill is the first case in which criminal penalties (in the form of fines) are sought against an uncertificated airline for international operations conducted in alleged violation of the Civil Aeronautics Act.

Penalties range up to $500 for first offense and not more than $2,000 for each subsequent offense.

Sign up with Stinson now!

Cash in on 22 years of public acceptance!

IT'S NO WONDER airplane buyers know Stinson as America's most *useful,* most *desirable* personal plane . . .

They've been hearing and reading about Stinson superiority for 22 years!

The story has been told, year after year, by thousands of enthusiastic Stinson owners . . . and by a continuous advertising and promotional program.

So when an airplane dealer hangs up the Stinson sales and service sign, he usually finds he's sitting right in the middle of a pre-cultivated market.

He can skip a big part of the "reputation-building" job and start concentrating on today's *sales* and *profits!*

This is just one of the reasons why the best dealers in the business are signing with Stinson!

Stinson leadership started in 1925, when this original Stinson became the first plane to combine a closed cabin, brakes on wheels, electric starter, and inherent stability. Stinson planes soon were famous the world over.

Today's best-selling 4-place plane is the new Stinson Flying Station Wagon. Here's generous room for four people and 100 lbs. of baggage, or two people and 440 cargo-lbs., or pilot and 640 cargo-lbs. *It carries the highest useful load of any 4-place plane built today!*

Tested merchandising methods are speeding the sale of America's most useful personal planes. Stinson pioneered, in the personal aviation industry, in applying the same merchandising methods that build a solid foundation—and lasting profits—in *every* modern business.

Wire now for the Stinson opportunity story!

Stinson has organized aviation's finest dealer team . . . and the organization is growing.

New opportunities are being created—*for qualified operators who act now!*

For complete information, wire, write or telephone—direct to Wm. H. Klenke, Jr., General Sales Manager, Dept. G, Stinson Division, Consolidated Vultee Aircraft Corporation, Wayne, Michigan. All inquiries will be kept confidential.

Stinson

FOR 22 YEARS, BUILDER OF AMERICA'S MOST USEFUL PERSONAL PLANES

Vol. 48, No. 7

AVIATION WEEK

Feb. 16, 1948

Aircraft Procurement Cut for Fiscal 1948

Requested by War and Navy Departments			
Army	1,844 planes	17,270,000 lb.	$611,496,000
Navy	1,296	8,963,000	480,771,000
Totals	3,140	26,233,000	$1,092,267,000
Requested by the President's Budget			
Army	932	12,647,000	$400,040,000
Navy	579	3,861,000	243,900,000
Totals	1,511	16,508,000	$643,940,000
Reductions by President in Original Requests			
Totals	1,629 planes	9,925,000 lb.	$448,327,000

Trebling Military Plane Production Urged in ACC Report to Truman

5789 aircraft per year urged as minimum national security requirement; reveals Truman 50 percent slash in plane procurement funds for fiscal 1948.

By ROBERT HOTZ

Trebling current military plane production to build 5789 planes a year with an airframe weight of 60,000,000 lb. was recommended last week by the Air Coordinating Committee in its annual report to the President.

This boost in ACC's estimate of the minimum airpower requirement for national security from the 3000 plane annual production rate it urged in 1945 was based on the deterioration of the international situation during the past two years. Aircraft industry built 1800 military planes in 1947. ACC recommendations follow closely the recent report of the President's Air Policy Commission on both the international situation and the airpower required to meet it.

▶**Truman Slash**—ACC based its new production rate on twin assumptions of at least a year's warning of the onset of a national emergency and a high degree of industrial mobilization planning. Both of these assumptions may now be invalid, the report warned.

A hitherto heavily censored Presidential slash of better than 50 percent in Air Force and Navy aircraft procurement funds for fiscal 1948 was revealed in the ACC report (see accompanying table). These cuts were made by the Budget Bureau and backed by Presidential approval. The Budget Bureau also slashed War Department and Navy requests for industrial mobilization planning funds from $27,180,000 to $12,080,000.

▶**Requests Still Valid**—Original fiscal 1948 procurement requests by the Air Force and Navy still represent minimum security requirements for strategic planning in relation to present world conditions, ACC believes. Aircraft procurement funds for fiscal 1946 and 1947 were sufficient to maintain the industry at 60 percent of its minimum security requirements with fiscal 1948 funds adequate to meet only 50 percent of these minimum needs.

Unless immediate action is taken to reverse the current trend of military aircraft production the airframe and engine industry will face a serious crisis in the last quarter of 1948 which will continue on through the first half of 1949, ACC predicted. Full and cumulative effect of below-minimum procurement will be felt during that period. Because of production lead time, ACC points out, this situation cannot be remedied by reliance on an increase in 1949 fiscal funds. Necessity for immediate increase in supplemental 1948 funds is implied.

▶**Industry Review**—Reviewing current state of the industry ACC emphasizes that commercial plane production will not provide an adequate base for expansion of military production in an emergency. Commercial transport production, including exports, totaled 487 planes in 1946 and was expected to maintain that level through 1947 and early 1948, with market saturation attained before the end of 1948. Listing current transport orders at 868 planes the report points out that if all transports on order for domestic use are delivered the airlines will have seating capacity 450 percent greater than the 1949 requirements forecast by the Civil Aeronautics Administration, admittedly a rosy view.

Research and development contracts and industrial mobilization studies are not adequate to maintain the aircraft industry in a readily expandable condition, the report concluded.

Most important problems facing aviation during 1948 are listed by ACC in the following order:

1. Determination of the proper level for an aircraft industry capable of meeting peacetime military and civil requirements and of prompt expansion to meet possible wartime demands.

2. Prompt and vigorous action to adopt and complete installation of additional traffic control and navigational aids essential to increase regularity and capacity of the domestic air transport industry. This program should be consistent with military needs and should follow recommendations of the Radio Technical Commission for Aeronautics on this subject. RTCA's report has been completed and will be announced shortly.

3. Full participation by the United States in the International Civil Aviation Organization.

Other ACC recommendations:

- Use of a standard ACC-prepared accident analysis manual by all federal agencies to produce safety statistics readily comparable and easily adaptable to standard statistical treatments.
- Preparation of a permanent plan for coordination of all search and rescue facilities over ocean areas to meet requirements of domestic and international civil aviation.
- Continued denial of domestic civil

aviation to Germany and Japan. All air transport required by these areas should be furnished by occupation authorities or by international civil air carriers of the United States and friendly countries.

• Completion of a study on the need for and the methods by which government assistance can be offered the development of new civil air transport planes.

• Completion of a study on the desirability of government aid in financing new equipment purchases for domestic and U. S. international carriers and on the methods whereby this might be best accomplished.

New Crews Trained In NAL Pilot Strike

The air transport industry's third postwar pilot strike has gone into its second week following a breakdown in efforts to submit the National Airlines-Air Line Pilots Association dispute to a five-man arbitration board.

NAL's 145 pilots struck on Feb. 3, halting operations which had been affected for two weeks by a walkout of clerks and mechanics (AVIATION WEEK, Feb. 9).

▶ **New Crews Ready**—Shortly after the National Mediation Board temporarily suspended moves to bring the two parties together, NAL indicated that it would attempt to resume operations with non-ALPA pilots. The carrier had sent telegrams to all except a small number of the striking pilots informing them that they were no longer in the company's employ.

The strike brought a flood of applications from non-union pilots for employment with the carrier. Miami, NAL's headquarters, is the center of charter and nonscheduled activities, with many pilots from these uncertificated lines constantly on the move between jobs.

▶ **Jobs Being Filled**—Last week, 28 non-union two-man flight crews were being checked out by National, with 12 more crews standing by. During the TWA pilot strike in the fall of 1946, the Military Pilots Association had expressed willingness to replace ALPA personnel if granted a long-term contract. But nothing developed from the offer.

National also reported that "most" of the jobs vacated by striking clerks and mechanics had been filled.

▶ **ALPA Position**—David L. Behncke, ALPA president, blamed the walkout on two factors: "1. increasing apprehension on the part of the pilots about flying planes whose safety aspects, from the standpoint of maintenance, were open to serious doubts due to the strike of ground employes; and 2. failure of the company to abide by an agreement arising from the discharge of a pilot (following an accident) more than two years ago." The ALPA chief said the strike has nothing to do with pilot pay.

Following Behncke's charges, National filed notice of a $5,000,000 damage suit against ALPA. A NAL attorney said the action was one for libel and slander and was based on the unwarranted intimation by the union that the airline's aircraft were unsafe.

▶ **NAL Replies**—National stated that during the clerks' and mechanics' walkout all its planes were approved for flight by CAA inspectors before each trip, adding that ALPA's mention of the safety factor was a "smokescreen." An extended pilot strike, coming on top of losses suffered as a result of the grounding of DC-6s since last November, would be a serious financial blow to the carrier. NAL has four DC-6s out of service because of the grounding.

ARGENTINE ATTACK PLANE

D.L. 22 is modified North American AT-6 used by Argentine Air Force as attack plane. Craft is armed with machine guns and rockets. It is being built at the Instituto Aeronautico de Argentina and is used for training purposes. Argentine Air Force has 100 Gloster Meteors purchased from Great Britain.

Policy Group to Seek Aircraft Fund Boosts

The Joint Congressional Aviation Policy Board is expected to take issue with the Air Force's proposal for an annual budget of from $6 to $7 billion in its report, due Mar. 1.

Sen. Owen Brewster (R., Me.), Board chairman, has already announced that "greatly increased" Air Force appropriations will be called for. The current year USAF allocation is $1.2 billion, and the proposed 1949 fiscal allocation, $1.7 billion. Both Brewster and the Board's vice chairman, Rep. Carl Hinshaw (R., Calif.), have indicated that their conception of "greatly increased" appropriations falls substantially short of $6 to $7 billion a year.

▶ **Hinshaw's Clue**—Hinshaw gave the clue to the line of reasoning which will be followed by the Board in setting a desirable USAF budget when he observed that "once a single strategic national defense plan has been drawn up, it will be possible to maintain proposed strengths for the Army, Navy and Air Force at far below—as much as 50 percent below—current estimates, since it will wipe out overlapping activities and overhead—as well as projects which do not fit into the overall plan and are therefore superfluous—existing in the uncoordinated strategic plans of the three services at present."

Observers estimate that the Board will probably recommend an air potential equal to the 70-group program proposed by USAF and indorsed by the President's Air Policy Commission but balk at approving the estimated $7 billion a year budget believed necessary for its realization.

▶ **Budget Angles**—On the $7 billion USAF budget proposal, one aspect of the national defense establishment's plan for a $20 billion a year defense program, Hinshaw, who is chairman of the Board's armed services subcommittee, observed:

"There are two ways by which the U. S. could become a Communist country. One is by selling out directly to Russia. The other is by spending ourselves into bankruptcy, setting the stage for Communists to take over—and that is precisely what a $20 billion a year drain on the U. S. Treasury for arms would accomplish. Such a gigantic national defense budget, instead of securing the U. S. against Communist aggression, would make it a ready prey."

The Congressional Board last week launched into a final series of executive sessions with its 20-member advisory council before starting to draft its report. After filing the report, due Mar. 1, the group will expire, leaving to the standing committees of Congress implementation of its recommendations.

Navy Boosts Order For Sikorsky 'Copters

New Navy order for 20 additional Sikorsky HO3S helicopters will bring to 46 the total of the type in fleet service upon completion of the total contract. These new craft will give the Navy a total of 88 helicopters of various types.

The HO3S, military version of the S-51, cruises at 85 mph. and has a top speed of 110 mph. With a main rotor diameter of 48 ft., it is 57 ft. long and stands 13 ft. high. It is powered by a Pratt & Whitney Wasp Junior engine of 450 hp. Rate of climb is 1200 fpm. Provisions are made for flotation gear for water landings, rescue hoists for life saving and extra fuel tanks for increased range.

Assignment of helicopters to regular fleet units for operational duties signalizes the completion of more than a year of service testing under rigorous conditions. The HO3S-1 was used in the Antarctic last winter. One Bell HTL and two Sikorsky HO3S helicopters are now being used for reconnaissance and transport work by the Navy task force now in the Antarctic.

The helicopters have proved particularly useful as carrier plane guards, replacing destroyers for the task. During a recent series of trials, helicopters were used to rescue six fighter pilots who landed in the ocean in carrier mishaps. Another time-saving job done by the Navy's helicopters is the delivery of mail and personnel between ships, doing the job in less than an hour that usually requires a full day's work for a destroyer.

Smithsonian to Direct National Air Museum

Smithsonian Institution will assume direct responsibility July 1 for about 100 wartime aircraft of historical importance now stored in the former Douglas Aircraft Co. plant at Park Ridge, Ill., for eventual display in the National Air Museum.

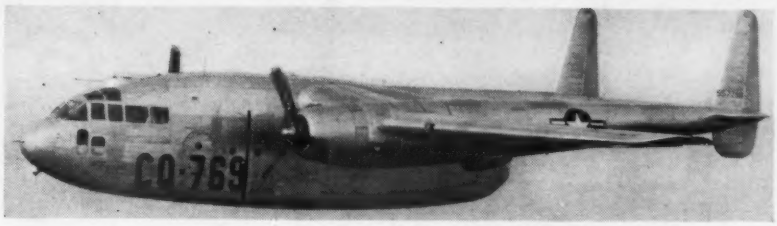
Presently administered by the Air Force, the huge structure will be transferred to War Assets Administration with the beginning of the 1949 fiscal year. Dr. Alexander Wetmore, Smithsonian secretary, has asked Congress for $75,000 for the protection and maintenance of this collection for the year. These planes occupy about 500,000 sq. ft. of the 1,700,000 sq. ft. total area of the huge plant.

► **Washington Location**—Plans for the new museum building, while not in the blueprint stage yet, contemplate a 500,000 sq. ft. structure with three stories in one area and four stories in another. Study of possible locations indicates that the museum will be built in Washington, D. C., on the Mall adjacent to the Smithsonian Institution. It will be designed to accommodate about 200 airplanes including the 32 planes now displayed at the Smithsonian.

The original Wright brothers flyer, upon its return to this country from the Science Museum, South Kensington, England, will occupy the top place of honor in the U. S. Air Museum, correctly labeled as the "first airplane capable of sustained flight."

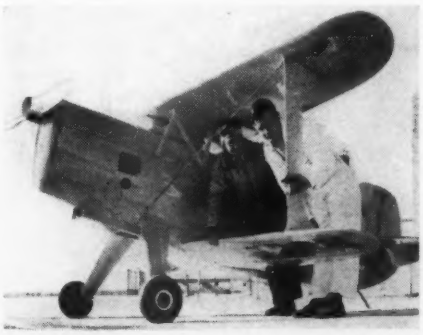
► **Some Disappointment**—Some enthusiasts are already showing disappointment at the modest plans for the museum, which will probably prohibit the display of complete large aircraft such as the Boeing B-29, Convair B-32, Douglas B-19 and others. Dr. Alexander Wetmore, Smithsonian secretary, says that any plan for the display of such large aircraft, through which visitors could pass, would be impractical due to space considerations. He favors the use of major assemblies, such as fuselages, and a liberal use of small scale models, the latter disappointing to many museum goers. Many famous items of equipment, such as the actual Norden bombsight that dropped the first atomic bomb, have already been assembled and will be displayed full size.

The National Air Museum is being planned by an advisory board, made up of the Chief of Staff of the Air Force, Chief of Naval Operations, secretary of the Smithsonian Institution and two private citizens appointed by the President. Present composition of the board includes Maj. Gen. E. M. Powers, representing Gen. Spaatz, Rear Adm. A. M. Pride, representing Admiral Denfield, Grover Loening, William B. Stout and Dr. Wetmore. The board received $49,146 for fiscal year 1948 and is asking $201,194 for fiscal year 1949. The increase is largely for salaries for the 11 employes needed at the Douglas Chicago plant for the custody of the planes presently stored there.



NEW LOOK ON THE PACKET

Latest flight picture of the C-119A, improved version of the Fairchild C-82 Packet, shows new configuration of the military's standard troop and cargo carrier. Marked change is in the nose, re-designed to give pilot and crew more visibility in all directions. Plane is built to carry nine tons of cargo 2000 miles.



DOLLAR PER POUND AIRPLANE

Built at a cost of $500, and weighing 500 lb., this craft was constructed over a period of a year by Edward O. Effenheim (right) and test flown by Robert E. Huggins (left), both of Milwaukee. Constructed of plywood, the tiny plane has a wingspan of 15 feet. No announcement has been made of commercial production. (Acme)

No-Fog Tests Planned At Lockheed Terminal

Conclusive tests of the controversial "No-Fog" heat-chemical fog dispelling system are planned, with Army Chemical Center, Md. serving as the guiding agency.

Four U. S. Weather Bureau observers and a like number from the Army are under 24-hour orders to make technical observations and reports when adequate fogs are reported at Lockheed Air Terminal, Burbank, scene of the tests. Results will be evaluated at the office of the Chief of the Weather Bureau and A.C.C.

Due to California's unusually dry winter, observation teams hold little hope of staging comprehensive tests before April, normally the Spring foggy month for the air terminal area. No-Fog equipment, consisting of four automatic oil-calcium chloride burner units, was installed at Lockheed last July. Since then the terminal has had no "good" fog conditions. Weather Bureau observers want a reasonably thick fog blanket with one-mile visibility or less. Six points of observation of results of No-Fog burns will be maintained.

NEW BELGIUM PRIMARY TRAINER

Two place, low wing plane built by Avions Fairey is an adaptation of the Tipsy "M" which first appeared in 1938. Featuring interchangeable 145 and 155 hp. engines, flaps and brakes, the 1826 lb. craft is said to have equally good visibility from either seat. Top speed is said to be 135 mph. and cruising speed 104 mph.

Nephews Will Decide Wright Plane Fate

Dr. Richard Eells, head of the aviation section of the Library of Congress, last week made application to executors of the estate of Orville Wright for some of the early Wright brothers papers to be placed in the Library in Washington along with other historic documents.

It was believed that other items from the extensive collection of early aeronautical data possessed by the Wrights would go to the Institute of the Aeronautical Sciences, which had sought them from Wright before his death.

▶ **Nephews to Decide**—Harold S. Miller, Dayton, and Harold W. Steeper, Lawrence, Kan., nephews of Orville Wright by marriage, and co-executors of his will, last week were expected to make the final decision as to whether the original Wright brothers plane should be returned to this country from the Science Museum at South Kensington, near London, or would remain there.

In view of the fact that Orville Wright had expressed his wish by letter that the plane be returned after World War II ended, and that the request had been acknowledged by the head of the Science Museum, there appeared little doubt that the executors would decide to ask its return. Indications are it will probably be placed in the new National Air Museum in Washington, when that is built.

Terms of Orville Wright's will left a $300,000 bequest to Oberlin College, in return for providing lifetime annuities to his secretary, Miss Mabel Beck; Charles E. Taylor, mechanic who built the engine for the first Wright plane, now of Dearborn, Mich., and several other people.

▶ **Airfoils to Franklin**—Franklin Institute, Philadelphia, was bequeathed the metal airfoils used by the Wrights in their first wind tunnel experiments which led to design of their first successful glider and the first power plane.

The Wright collection of bronzes and medals was left to the Dayton Art Institute.

Other historical items were left to be distributed at the discretion of the executors.

Rest of the Wright estate, including his Dayton home and his summer home on Lambert Island, Georgian Bay, Canada, is to be divided among nieces and nephews.

Delta Buys 5 DC-6s For September Delivery

Douglas Aircraft Co. last week reported new DC-6 orders from Delta Air Lines and United Air Lines which brought total sales of the craft to 149. Delta, which now operates seven DC-4s and 19 DC-3s, bought five 58-passenger DC-6s plus spares for about $4,000,000, with delivery scheduled in September. The carrier has an option to buy six more. United, which received its full previous order of 35 DC-6s, is obtaining six additional craft. Of the 149 DC-6s ordered from Douglas, 37 have been purchased by foreign carriers.

Dividends Drop

Publicly reported cash dividend payments of aircraft manufacturers and airlines dropped sharply during 1947 in contrast to the rest of U. S. industry. While 1947 dividend payments on 964 representative stocks were up an average of about 20 percent, aircraft dividends were down 48 percent and airline dividends fell nearly 64 percent compared with 1946.

NEWS DIGEST

DOMESTIC

Livingston T. Merchant, chief of the State Department aviation division, has been assigned to Nanking, China, as counsellor of the embassy.

Lockheed P-80's have been assigned to the air defense of the Panama Canal. Formation of 26 of the 80 P-80's now in the Canal Zone recently completed a 3,665 mile flight from California.

Prohibition of night landing flares on Douglas DC-6 aircraft has been extended by the CAB to May 1, after which all DC-6's will be required to have fireproof installations around flare compartments.

Civil Aeronautics Administration's latest aircraft census reveals 99,644 civil aircraft registered in the U. S. as of Nov. 1, 1947. Listed were 484 four-engine planes.

FINANCIAL

National Aviation Corp.'s annual report shows net ordinary income for year ended last Dec. 31 of $115,001.78, compared with $156,020.03 for the preceding year. Total income in cash dividends and interest was $186,846,89 for 1947, against $231,177.15 for 1946. The investment trust expenses for the two years, respectively, were $71,845.11 and $81,157.12.

Johns-Manville Corp. reports 1947 consolidated net earnings of $9,486,633, or $3.23 per common stock share; comparative 1946 figures were $5,836,613 or $2.01 a share. Before taxes earnings for 1947 of $17,678,905 were $10,278,403 higher than the corresponding figure for 1946. Company makes jet engine blankets, engine gaskets, propeller seals and gaskets, asbestos textiles, cabin insulation and other products for the aviation industry.

FOREIGN

Qantas Empire Airways is now operating an all-cargo service over the 12,000 mile Great Britain-Australia route using Avro Lancastrian transports. The latter became available for the mail and freight service after the introduction of Lockheed Constellations over the route for passenger service.

Governments of the United States and Portugal have concluded a three- to five-year agreement permitting the use of landing facilities in the Azores by U. S. military aircraft. Previous agreement had permitted U. S. military aircraft to use Lagens Airfield only in connection with occupation duties in Germany and Japan.

George Resigns as Head Of Peruvian International

Lieut. Gen. Harold L. George, retired wartime head of the Army's Air Transport Command, has resigned as president, manager and director of Peruvian International Airways. He will remain with the company as adviser.

D. R. A. Walker of Wood, Gundy & Co., Canadian investment bankers, is to succeed General George. Luis Gallo Porras, member of the board of directors and Peruvian banker, has been elected vice president of the carrier. Company officials state that additional capital has been obtained.

AVIATION CALENDAR

Feb. 16-17—Second annual Purdue Airport and Fixed Base Conference, Purdue University, West Lafayette, Ind.
Feb. 17-19—ATA meterological committee, Peabody Hotel, Memphis.
Feb. 26-27—Louisiana Aviation Conference, Shreveport.
Mar. 3-4—Government-industry meeting on self-locking nuts, Wright Field, Dayton, Ohio.
Mar. 5—Government-industry meeting on magnetic inspection of nuts and bolts, Wright Field, Dayton, Ohio.
Mar. 8—ICAO maps and charts division, Brussels.
Mar. 12—AIA airworthiness requirements technical committee, western division meeting, AIA office, Hollywood, Calif.
Mar. 18-19—California State Aviation Conference, Hollywood Roosevelt Hotel, Hollywood.
Mar. 19—National flight propulsion meeting, Institute of the Aeronautical Sciences, Hotel Carter, Cleveland.
Mar. 22—ICAO aeronautical maps and charts division, Brussels.
Mar. 28-31—Annual conference, Society of the Plastics industry, Santa Barbara, Calif.
Mar. 30—ICAO personnel licensing division, Montreal.
Mar. 30-Apr. 1—Air Transport Association engineering and maintenance conference, Continental Hotel, Kansas City.
Apr. 1-3—American Institute of Electrical Engineers, Des Moines.
Apr. 4-8—American Association of Airport Executives, Congress Hotel, Chicago.
Apr. 20—ICAO rules of the air and air traffic control division, Montreal.
Apr. 24—Dedication of Skyway 1 and 11 and dedication of CAA aeronautical center, Oklahoma City.
Apr. 27—ICAO facilitation division, Europe.
Apr. 28-30—American Institute of Electrical Engineers, northeastern district meeting, New Haven, Conn.
May 12-15—Aviation Writers Association, 10th Annual Convention, New York City.
June 1—ICAO second assembly, Palais Des National, Geneva, Switzerland.
June 14-15—Airlines Medical Directors Association, annual meeting, Royal York Hotel, Toronto.
June 15-17—Airport management conference, College Station, Tex.
June 16-18—19th annual meeting, Aero Medical Association, Royal York Hotel, Toronto.
June 21—American Society for Testing Materials, annual meeting and exhibit, Detroit.
June 22-23—Third annual state aviation clinic, Bowling Green, Ohio.
July 15—Ninth annual meeting, Airline Advisory Board, Kansas City, Mo.
July 31—International Air Exposition, Idlewild Airport, New York.

INDUSTRY OBSERVER

► **Air Force is installing special 10 ft. glass fiber wing panel sections on a Douglas C-54 Skymaster as a radar and electronic flight research airplane. The nonmagnetic and good electrical qualities of the plastic material are utilized to prevent interference with electronic equipment mounted within the panel. Purpose of the program is to develop high-strength plastic wing materials to contain future radar and communication equipment on high speed aircraft, on which antennae are impractical.**

► Wind tunnel tests have revealed that the McDonnel XP-88 swept wing interceptor, now nearing completion for the Air Force, cannot use wingtip auxiliary fuel tanks due to their adverse effect on stability of the airplane.

► **Lockheed Aircraft Corp. and the Air Force are developing a sandwich wing for installation on an experimental P-80 Shooting Star jet fighter. The material is a metal-honeycomb sandwich which will provide improved surface smoothness to the P-80 wing. A major advantage of the sandwich wing is its absence of internal structure, permitting an increase in wing fuel stowage space on the P-80.**

► McDonnel XHJH-1 twin-rotor utility helicopter has been virtually abandoned by the Navy due to vibrational difficulties. Although Constantine L. Zakhartchenko, designer of the craft, has followed a number of methods designed to eliminate the difficulty, none has proved entirely successful.

► **Air Force is conducting tests on a sandwich material monocoque tail boom assembly for the Northrop P-61 Black Widow night fighter. The boom is fabricated of glass laminated plastic, similar to that used on the fuselage of a Vultee BT-15 during the war. The circular, pure monocoque nature of the boom is the standard type projected for guided missiles.**

► Glenn L. Martin Co. has revealed that the honeycomb sandwich flooring used on the 2-0-2 is more expensive than conventional reinforced aluminum alloy flooring used in other transports, negating original estimates of cost savings in the development.

► **Frank W. Davis, Convair assistant chief engineer, reveals that propeller driven aircraft have exceeded the speed of sound for brief "moments."**

► Curtiss Airplane Division, Columbus, delivered the last Curtiss SC-2 Seahawk to Naval Air Station Patuxent, completing the wartime contract for the Scout seaplane.

► **SAAB 29, a swept wing jet fighter, is expected to be flying this summer. Svensk Aeroplan A. B. has abandoned the jet version of the S-21 due to air intake difficulties creating large duct losses in the air supply to the engine.**

► Landgraf Helicopter Co. has a second Air Force contract for the experimental development of rotor blades. The contract calls for the design, stress analysis and construction of a set of rotors for the Landgraf helicopter, now undergoing flight tests under a previous Air Force contract.

► **War Assets Administration offers one remaining Goodyear F2G-1 Navy fighter for surplus sale. The F2G-1 is similar to plane piloted to victory in the 1947 Thompson Trophy Race by Cook Cleland. The surplus Corsair is located at Bush Field, Augusta, Ga., and may be inspected through Feb. 23. It will be sold to the highest bidder with a $300 deposit being required.**

► Final phase of company test flights with the Lockheed XR-60-1 Constitution is now under way with a full 3500 hp. being obtained from the four Pratt & Whitney Wasp Major engines for the first time. Following completion of these tests on No. 1 airplane, it will be flight delivered to Naval Air Station Patuxent for phase 11 tests by Navy pilots. The huge transport completed 50 flights during 1947 and logged more than 100 hours covering more than 20,000 miles. Final flight tests are being made at full 184,000 lb. gross weight including 76,000 lb. of fuel and equipment and 20,000 lb. of water ballast.

► **Twenty selected Air Force students are now receiving 20 hr. of flight time in Lockheed P-80 jet fighters, at Williams Field, Chandler, Ariz. This is the first group in the new Air Force training plan specifying jet fighter training for all pilots in single engine advanced flight schools.**

► Frederick B. Rentschler, United Aircraft Corp. chairman, reveals that Pratt & Whitney division must spend $15 million in the immediate future and an additional $15 million at a later date for gas turbine research facilities if it is to remain in the field. The additional funds will be required when, and if, turbine power goes above 10,000 horsepower.

LETTERS

Blimp's Endurance Record

To the Editor:

In AVIATION WEEK (Nov. 24) appeared a small item on the longest endurance flight without refueling. You gave credit to a Boeing B-29 which remained aloft for 22 hours, 15 minutes. An endurance record of 170.3 hours without refueling was established by a Navy "M" type non-rigid airship from Oct. 27 to Nov. 3, 1946. This airship piloted by Lieut. H. R. Walton carried a crew of 13 and flew 5225 air miles.

L. W. S. CUMMINS, Lieut, USN
Naval Air Station
Lakehurst, N. J.

Pneumatic Retraction

To the Editor:

We note the article on Page 26 of the Jan. 19 AVIATION WEEK concerning aircraft pneumatic retraction systems and other similar pneumatic devices.

The first Beechcraft biplanes, built in 1934, employed pneumatic retraction of their landing gear. An air pump was installed in the engine and an air storage tank with about 475-lb. pressure per square inch was used as a source of energy for the retracting cylinder. The writer personally flew No. 4 Beechcraft for approximately two years with this equipment installed and found it most successful. The retraction time for the wheels was approximately ¼ to ½ second. Extension of the wheels was by gravity and the final extension to the locked position was by handcrank. If the pilot pulled back slowly on the yoke, the wheels would go down and lock themselves.

JOHN P. GATY, Vice President, Gen. Mgr.
Beech Aircraft Corp.

Disliked Air Speed Indicators

To the Editor:

I have just read the angry letter of Flight Instructor Elveron Hoyt in the Jan. 12 AVIATION WEEK, due to a previous editorial suggesting that mandatory installation of one of the new type stall warning indicators in all aircraft might be a good idea, and one that would make flying safer and thus more popular.

Instructor Hoyt seems to have great faith in the airspeed indicator as a stall warning indicator. I have been told that airplanes can be stalled at very high speeds, even at nearly top speed for any type. All students of flying are told too, that in banked turns the stalling speed increases a certain number of miles per hour for each few degrees of bank over that figure given for level flight.

Leaving out the factor of mechanical reliability, it seems a little too much to ask beginning pilots to calculate the actual stalling speed for various conditions from the indicated speed and the design stalling speed for level flight. Further, the airspeed indicator doesn't attract the attention of the pilot by horn and light while he is probably busy watching conditions outside of the cockpit or cabin.

I am pretty much in agreement with Hoyt that there is room for improvement in the airplane as it is now sold on the score of stalls and spins, and that manufacturers in their advertising do give the impression that Hoyt describes. I suppose that it is a year to two of fairly consistent effort on the part of the would-be flyer before he is competent to get in an airplane and go very far from his home port. . . .

I think that much more cross country experience during the initial training period, as is now being advocated in many places, plus the stall warning indicator, would enable new flyers to go places sooner than just around an airport and encourage more people to fly and to keep on flying after having learned. . . .

If Instructor Hoyt had anything to do with aviation before he started to make his living in 1941 by giving flight instruction, he might recall that several years prior to 1941 flight instructors were writing indignant letters about the idea of making airspeed indicators compulsory equipment on aircraft, saying that if pilots learned to fly using an airspeed indicator they would never amount to much as pilots.

My experience with the stall warning indicator is confined to about an hour in a lightplane so equipped. I am certainly not an expert or an authority, but the instrument seemed to do all that is claimed for it, and I think it would be advantageous in all airplanes. I suppose that as long as installation is not mandatory there will be pilots who consider such an instrument a reflection on their ability. . . .

R. G. MITCHELL
Wilmette. Ill.

Fighting Pride & Prejudices

To the Editor:

Thanks for your editorials and comments on the stall warning indicator. Being one of the first distributors appointed by the Safe Flight Instrument Corp. and having fought the pride and prejudices of professional pilots since receipt of our first instruments, I take particular delight in the way light is being shed on a subject the ignorant and scornful prefer to keep in darkness.

Progress it seems has always been blocked by those resentful of any infringement on their sacred domains. Thank God for printers ink in the hands of intelligent people.

SILAS KING
Western Skyways Service
Portland, Ore.

Insurance Man Speaks

To the Editor:

In the Letters page Jan. 5 is not Mr. Beverly Howard comparing apples with oranges?

A comparison of mandatory stall warning indicators for aircraft with mandatory safety belts for automobile passengers is misleading and unfair. It would be much more logical to consider the stall warning indicator as a device similar to the windshield wiper, stop light and horn for the automobile, all required by practically every state law.

Installation of a stall warning device would add very little to the total cost of a new aircraft, would cause inconvenience to neither pilot nor passenger, and would provide completely automatic checking of flight attitude, regardless of the experience of the pilot.

Reference to the rating schedules of the Transportation Insurance Rating Bureau, of which this company is a member, will show you that our aircraft committee thinks enough of the stall warning indicator to give a substantial rate credit for its installation. Furthermore, it is my personal opinion that installation of such a device should be mandatory.

T. L. OSBORN, JR., Assistant Secretary
National Retailers Mutual Insurance Co.
Chicago, Ill.

No Complaints in 1200

To the Editor:

We have been reading with interest your editorials and the letters to the editor regarding use of stall warning indicators in private planes. . . .

The Beechcraft Bonanza has had a stall warning indicator as standard equipment since the first airplane was built. There are over 1200 of them in use today and we have never heard any complaints or criticisms against the indicator as a safety device. Rather, we have received a number of compliments on being the first aircraft manufacturer to install these safety devices as standard equipment.

We are 100 percent behind your excellent efforts to improve the safety standards of private airplanes. . . .

LEE H. SMITH, Sales Manager
Beech Aircraft Corp.
Wichita, Kan.

Praise for Norwood

To the Editor:

I read with interest your Jan. 5 editorial on CAA inspectors. I would like to commend those at the Norwood, Mass., regional office: Roy G. Kunze, William F. Placek, and Frederick W. Falconer. . . .

In most instances these inspectors are under-paid, understaffed and overworked. In my estimation, despite these handicaps, they are performing their duties in a highly satisfactory manner.

HENRY A. LAUGLIN, JR., Vice President
North Atlantic Airways, Inc.
Beverly, Mass.

Appalled at 'Remedies'

To the Editor:

If someone doesn't take an opposition stand to stall warning indicators, it appears that they might be made mandatory at an early date.

I am appalled at the frequency that remedies for aviation ills are accepted by the spokesmen for aviation without considering more than face value. It is particularly discouraging and harmful when heads of so called safety research organizations take the stump without having properly considered their speeches.

JOHN W. THORP
Pacoima, Calif.

ENGINEERING & PRODUCTION

Surplus Planes and U. S. Aircraft Bulk Large in Canada's 1947 Sales

Plane manufacturing output generally low; Canadair major producer; many plants still busy with reconversion of wartime craft.

Canada's aircraft manufacturing industry turned out few aircraft during 1947, bulk of its aircraft sales being war surplus planes and imported aircraft from the U. S.

Little production of personal planes was accomplished, Fleet Aircraft, Fort Erie, Ont., having a backlog of Fleet Canuck aircraft on hand, and Cub Aircraft of Canada, Hamilton, Ont., producing some Cub models. Both companies are also producing other commodities, from washing machines to trucks.

▶ **DC4-Ms for TCA**—Major aircraft production in Canada was at Canadair Ltd., Montreal, where 15 DC-4M North Star transports were turned out for Trans-Canada Air Lines. Company is continuing production to fill an order from TCA for 20 pressurized DC-4Ms and from RCAF for about the same number. Export of the DC-4M has not yet started but is expected to follow completion of Canadian orders.

Canadian Car & Foundry, Montreal, produced a number of Norseman single-engined freight carrying aircraft, but did not produce any more Burnelli flying wing cargo-passenger ships than the one model made in 1946, which has been on charter freight services into the Labrador region.

▶ **First Canadian Copter**—Montreal also saw during the year production of the first Canadian-built helicopter, the Bernard Sznycer-Selma Gottlieb machine constructed for Intercity Airlines of Montreal.

Fairchild Aircraft Ltd., Montreal, decided to close up its operations, after designing and building a few single-engined cargo-passenger ships, the Fairchild Husky, and its selling plant and equipment to produce the Husky, designed for bush operations. It had gone into aluminum housing immediately after the war but has stopped this production also.

▶ **De Havilland Freighter**—In Toronto, de Havilland Aircraft of Canada, Ltd., continued to make the postwar-designed Chipmunk trainer for the RCAF and designed and built a single-engined freighter, Beaver. It has a backlog of orders from all parts of the world for the latter and has sold 25 to the Ontario government. Production on the Beaver is now under way, with one aircraft a week coming off the assembly line. De Havilland is also assembling British-built de Havilland Vampire jet fighter aircraft for the RCAF, and has designed floats for the British-built Dove, all-metal feederline version of the Mosquito.

A. V. Roe Canada, Ltd., operating in the wartime Victory Aircraft plant at Toronto where Lancaster bombers were made, is at work on production of Canadian-designed jet engines, first of which is to be tested early in March. It is at work on a jet-propelled fighter for the RCAF and has started production of the prototype of a 30-passenger commercial jet-propelled transport for North American transcontinental services, first of which is to be test flown early in 1949.

Curtiss-Wright Post Goes to W. D. Kennedy

William D. Kennedy, vice president and general manager of the Wright Aeronautical Corp., engine manufacturing division since 1945, has been named a vice president of Curtiss-Wright Corp.

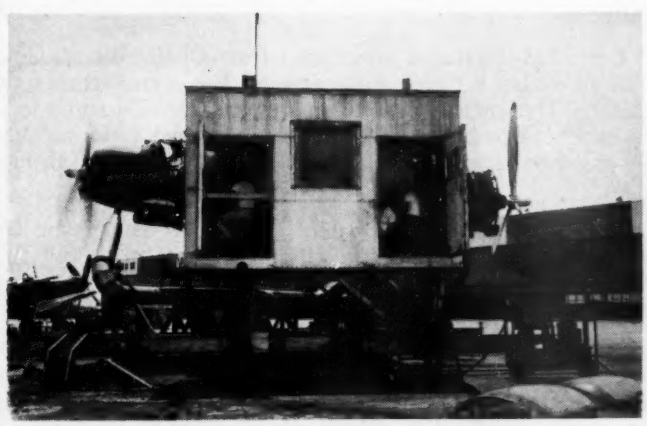
He will retain his post with Wright Aeronautical, directing the engine division's activities.

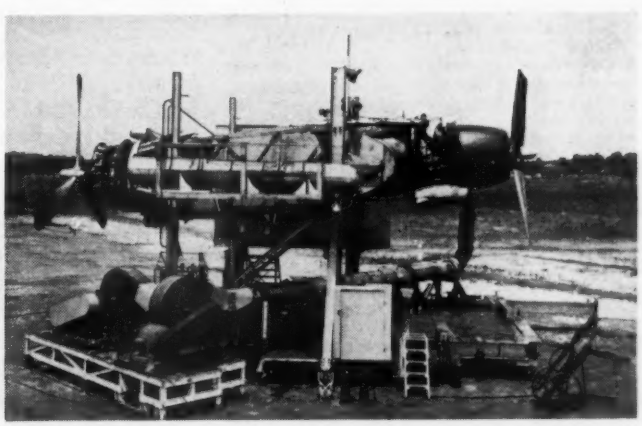
After joining Curtiss-Wright in 1928, Kennedy was service manager for several years. Promoted to manager of sales and service in 1940, he was named vice president in charge of that department later in the same year.

Before his association with the company, he organized the maintenance branch of the field service section of the Air Corp Materiel Division and served the Air Corps as civilian chief of maintenance for seven years.

In other personnel actions:

• **National Foam System,** elected Hart T. Fleming, president to succeed Fisher L. Boyd, who has been named chairman of the board. George Blair was reelected vice president; with L. H. Souder named treasurer as well as secretary of the company.





Flight test engineers at Glenn L. Martin Co., Baltimore, have developed a unique engine test stand designed to mount two engines rather than one as on conventional type stands. The two engines are not run simultaneously, but even so, appreciable time is saved because twin installations can be erected and tested without interruptions caused by necessity of removing one engine and substituting another. Recording instruments and test crews are stationed in a small house located high on one side of the stand. The entire test unit weighs 25 tons.

Frank R. Wallace, president of the Tabor Manufacturing Co. has been elected a director of National Foam System.

• **Wilcox Electric Co.,** appointed Donald E. Busse, sales engineer. Busse for the past ten years has been associated with Trans World Airlines as supervisor of ground radio engineering. During the years 1935-1937 he engineered the development and installation of the Kansas City two-way police radio system.

• **Kaman Aircraft Corp.,** named C. H. Kaman, E. B. Hotchkiss, E. M. Beals, Jr., M. H. Glover, J. C. Parsons, Gerard Morrissey and Mrs. H. S. Kaman as the Board of Directors for 1948. Mr. Morrissey and Mrs. Kaman are the new Board members. Mr. Kaman continues as Chairman of the Board and president. Mr. Parsons was renamed as secretary.

• **Wayne Pump Co.,** appointed J. F. McDonald, manager of the Aviation sales division. McDonald was formerly Mid-Western division manager of the Smith Meter Company. He began his new duties Jan. 5, 1948. McDonald will be responsible for the sale of the new aircraft refueling systems for use at airports.

• **General Electric Co.,** appointed Andrew Westhead, district sales manager of the New England district for the G. E. chemical department. Westhead was formerly in charge of the department's Springfield, Mass. sales office. He came with General Electric in 1940 as a sales trainee in the plastics division. William B. Frackleton has been appointed district sales manager of the central district of the chemical department. Mr. Frackleton's headquarters will be in Chicago. He has been associated with General Electric since 1928 when he enrolled in a G. E. Test Course.

• **Westinghouse Electric Corp.,** appointed F. D. Weatherholt, assistant industrial sales manager with headquarters at East Pittsburgh. Weatherholt has been with Westinghouse since 1921. In 1940 he was named eastern resale manager, the position he held at the time of his new appointment.

• **Timken Roller Bearing Co.,** named L. D. Gable, general manager to succeed William A. Fowler who retired Jan. 31. Gable joined the company in 1912. In 1940 he assumed the duties of general superintendent of the bearing factory, which position he held until his transfer to Columbus in 1945.

• **General Controls Co.,** appointed E. B. Maire as sales manager of several Midwestern, Southern and Eastern branch offices. He will assist and coordinate the efforts of these offices. Maire was formerly regional sales manager of the company.

• **Eutectic Welding Alloys Corp.,** appointed Theodore I. Leston, vice president in charge of production. Leston became director of production in late summer of 1947, and now assumes full charge of manufacturing.

• **General Motors Corp.,** Packard Electric Division, appointed Vincent J. Boos, special sales representative. Boos will work on roving assignments under the direction of A. A. Kiekhofer, central div. manager.

• **Parker Appliance Co.,** elected Otto P. Bereit, treasurer and comptroller. Bereit was formerly comptroller of the company. In his new position Bereit relieves S. B. Taylor, president, of his duties as treasurer. Bereit joined the company in 1943 having previously been comptroller and assistant general manager of the Geometric Stamping Co., and manager of factory accounts at the Thompson Aircraft Products Co.

• **Thermo Electric Co.,** appointed Glenn O. Carson, as representative in Washington and Oregon.

• **Kellstrom Tool Co.,** appointed Arthur I. Falk as sales representative to furnish special information on propeller tools and overhaul shop tools. Falk recently returned from Japan where he served as a propeller specialist representing the U. S. Air Force. Prior to that he was service representative for Hamilton Standard.

• **Lockheed Aircraft Service,** named F. E. "Ed" Maliar, supervisor of training. Until recently Maliar was supervisor of maintenance procedure at Colonial Airlines and formerly was with American Overseas Airlines after serving with the Air Transport Command.

BRIEFING PRODUCTION NEWS

► **Sikorsky Aircraft Division,** United Aircraft Corp. has turned out its first production parts on its new Bliss 5,000 ton hydraulic press. First job set up in the huge press is a run of cabin parts for the four-place Sikorsky S-51 helicopter. The press uses the Guerin process of rubber blankets, which obviate the necessity for female die forms. Weighing 450 tons, the press was shipped to Bridgeport, Conn. in ten freight cars from its former location in Cleveland, Ohio.

► **Walter Kidde & Co.,** manufacturers of aircraft fire extinguishing equipment, has established a world-wide network of recharge stations to provide service to permanent installations in factories as well as aircraft on international routes. The network presently includes 169 stations in 45 different foreign countries.

► **Piasecki Helicopter Corp.** has established a maintenance training school for Navy and Marine Corps service personnel. The school provides overhaul and maintenance instruction for the Piasecki HRP-1 helicopter being delivered to Navy and Marine Corps units. The class is directed by T. R. Pierpoint, Piasecki service manager and includes classroom lectures, shop experience and flight test operations.

► **Vapor Heating Corp.** is the new name of the Vapor Car Heating Co., Inc., manufacturers of temperature control equipment for automobiles, railroad passenger cars and aircraft. The new name encompasses the expanding aviation business of the firm.

► **Esso Export Corp.** has been formed to assume the function of the Standard Oil (New Jersey) Export Corp. and to coordinate the activities of the various Esso subsidiaries and affiliates in the international aviation fuel and oil fields. These activities were formerly carried out by Intava, Inc., which was disbanded recently.

► **Brooks and Perkins, Inc.,** manufacturers of magnesium aircraft and airborne parts and equipment, with headquarters in Detroit, has opened a Washington, D. C. office. Calvin H. Corey will manage the new office and act as consultant to the Air Force and Naval Aviation in the fabrication of aircraft subassemblies from magnesium.

► **Boeing Aircraft Co.,** Wichita Division, has boosted employment to 1,700 and is working two shifts in the production of B-29 spares, B-50, Stratocruiser and Stratofreighter major assemblies and production of L-15 liaison planes for the Army Ground Forces.

► **Beech Aircraft Corp.** is at its lowest employment level since before the war with only 2500 workers. However, daily production is being maintained at the rate of three Bonanza and one twin-engine Model 18.

► **The Garrett Corp.,** parent company of AiResearch Manufacturing Co., announces employment of 1200 and a current backlog of $7,500,000 consisting of specialized air conditioning and pressurization equipment for high altitude aircraft. Backlog is divided into about two-thirds for military services and the balance commercial aircraft sales.

► **Schweizer Aircraft Corp.** has received a subcontract from Chase Aircraft Corp. for the manufacture of all control surfaces of the new Air Force production order for Chase CG-18A gliders. The assemblies to be built at Elmira, N. Y. include 25 ft. stabilizers, elevators and ailerons. Schweizer has manufactured various aircraft subassemblies for the past two years including rudders and ailerons for the Fairchild C-82 Packet.

► **Curtiss-Wright Corp.** is the assignee for a patent awarded to Sam Payne and Camille H. Lemonier for a cargo plane "kneeling" landing gear. The device would permit the cargo plane fuselage to drop down to the ground for cargo handling operations after which the landing gear is straightened and the takeoff is made. Payne is a 30-year Curtiss-Wright employee.

► **Kollsman Instrument Division** of Square D Co. announces increased European business with recent orders for flight and navigation instruments being received from Swedish, Norwegian, Danish, English and other foreign airlines, air forces and aircraft manufacturers. Among the new Swedish aircraft being equipped with Kollsman instruments are the "Safir" and "Scandia" built by the Saab Aircraft Corp. The "Scandia" is equipped with two types of Kollsman sensitive altimeters, tachometer generator and indicator, airspeed indicator and pitot static tube. The "Safir" uses Kollsman altimeter, airspeed indicator, and floating card type compass.

Operational Safety Increase Seen As Major Aviation Need

Adverse publicity retards industry and slows public acceptance. Accident rate of private flying termed "shameful."

By JEROME LEDERER
(*Aero Insurance Underwriters*)

Experience shows that as airplane accidents increase or are unduly publicized, the public loses its enthusiasm for flying, with obvious consequences to production business and costs of operation. This is true, even while the accident rate improves, as long as the newspapers continue to headline serious accidents. The public is more impressed by the dramatic impact of headlines and gruesome photographs than they are by favorable safety rates.

The President's Air Policy Commission in its recent report entitled "Survival In The Air Age" gives to safety the following force:

"The question of safety in commercial aviation is of prime importance, not only because of the importance of human life but because of its psychological effect on traffic and the effect of traffic upon the self-sufficiency of the airlines. . . . The disproportionate amount of publicity inevitably given airline crashes gives an unwarranted impression that airline travel is basically unsafe. Statistics on scheduled airline operations compiled by the Civil Aeronautics Board show that the chances of fatality in terms of passenger miles flown are very slight."

The Commission's report does not come to any conclusion on the safety of personal flying. Unfortunately, except for the relatively few pilots and organizations that have achieved a good record it is very far from being as favorable as the airline picture.

Before acceptance of the assertions an investigation into the manner by which aviation safety is measured should include: The appropriateness of the information or yardsticks used to record safety; the magnitude of the records; the record relative to other forms of transportation; the trend in the safety record.

► **Appropriateness of Yardstick**—We should try to find a true and practical yardstick preferably one that leaves a legible mental image and that measures life expectancy or freedom from injury. It may be based on passenger fatalities, fatal accidents, near fatal accidents; per mile, per hour, per aircraft, per passenger mile, per flight or whatever is accepted as an honest standard.

► **Magnitude of Records**—Significance of the data: How do they match against the ordinary hazards of living and the public's concept of an acceptable degree or magnitude of safety? Are there sufficient units to allow the mathematical laws of large numbers to operate?

► **Comparative Record**—The record in flying compared with safety in other means of transportation: This is necessary to satisfy the public's demand for comparative statistics and also for the evaluation of one airline or one airplane against others or to compare personal flying with airline flying. There is considerable doubt as to whether the one yardstick is appropriate for all forms of transportation or for all forms of flying.

► **The Trend**—Study of fluctuation in the record to determine if it is getting better or worse, both in the absolute sense and in comparison with other systems of transportation. If certain yardsticks are used, it is possible to show that the safety of airlines has been approaching the safety of Class I railroads, not so much on account of improvement in airline safety but because the railroad record its deteriorating.

► **Concepts of Public Safety**—The yardstick commonly used to measure safety in transportation is passenger fatalities per 100 million passenger miles travelled. This may be a result of habit established to measure railroad safety. It's probably a good criterion for railroads because in a typical railroad accident usually only a small percentage of the passengers are killed. (When a fatal accident occurs there is still a reasonable chance of survival.) In 1946 the passenger fatality rate was about one in 560 million passenger miles or .18 per million passenger miles.

That is a good record and it seems to be based on a sound yardstick. In the absolute sense no reasonable person would hesitate to ride in a railroad train with his chances of being killed at one in 560 million. In the relative sense using the same yardstick, the safety of travelling by bus is about the same as by railroad; the domestic airlines rate on the same basis of fatalities per 100 million passenger miles is about eight times that of the railroads but about 60% better than travelling in a passenger automobile or taxicab. The public does not hestitate to ride in autos or cabs. (See Table I.)

But fatal accidents involving aircraft usually result in a very much larger percentage of occupants being killed than in a train so a better yardstick is to reckon flying safety in the same terms as might a member of the flight crew. A pilot could not accurately measure his air life expectancy on the basis of passenger miles because he rides whether or not passengers are being carried. He should reckon his exposure to fatality on the basis of pilot fatalities per hour or miles of exposure flown or per thousand hours or miles flown. The true standard of safety should be life expectancy which for aircraft is more nearly akin to hours or miles one has left to live while flying than so many passengers travelling so many miles.

An airline passenger using this approach could figure on flying, domestically, 62,740,565 miles before being involved in a fatal accident on a certificated airline. This is based on the domestic airline experience in 1947, which on the accident mileage basis, is the best on record. There is an appreciable difference in magnitude between this and the year 1938 the worst airline year since CAA has kept records. In 1938 the record was one fatal accident in 13,679,660 miles flown. However, it is practically impossible for anyone to discern one part in 13 million. It is about on par with the hazard of driving a passenger car at night in the country and therefore is still acceptable to the public.

The yardstick to use is aircraft miles or hours flown per accident, not per fatal accident but per accident because the difference between a fatal and a non-fatal aircraft accident is at present too often a matter of luck. For the years 1943-1947 this averaged one accident per 8 million aircraft miles. There is sufficient similarity in overall operating procedures so that one would not make any appreciable discrimination

Table I—Transportation Accident Death Rates 1944-46

(From Accident Facts Published by National Safety Council)

Passenger Automobiles and Taxis	2.7	Average death rate per 100 million passenger miles.
Buses	0.19	
Railroad Passenger Trains	0.21	
Scheduled Air Transport	1.7	

between airlines, although there are recognizable differences in management and attitudes.

Some European aviation insurance experts are considering the number of fatal accidents per thousand flights. This might be an honest yardstick when it is possible to agree on a definition of a flight and then to obtain the statistics on the numbers of flights.

Another way one might gage his absolute safety is to determine the proportion of airline passengers that are killed in airline accidents. In the five years ending with December 31, 1947 the rate has been 421 passengers killed for 39,397,000 carried or a rate of almost one per 100,000. (In 1947 the rate was 1.6 per 100,000 passengers because of larger aircraft being used and more occupants killed per crash.) That this is well within acceptable magnitudes (though far inferior to the railroad or bus record) is shown by the comparisons for 1945 taken from the World Almanac (Table II).

Table II—Death Rates by Chief Causes for 1945 per 100,000 Population

1. Accidental Deaths	72.7	
2. Accidental Drowning	4.3	
3. Motor vehicle accidents	21.3	(includes pedestrians as well
4. Conflagration	2.7	as occupants
5. Homicide	5.6	
6. Air Transport	2.2	

The airline safety record by any yardstick appears well within magnitudes of safety acceptable to the public. Nevertheless the airlines have a moral obligation, and a financial incentive to continue to make it safer.

Airline accidents due to fires in flight or structural failure are important but of a transitory nature. The outstanding factor in producing fatal or potentially fatal airline accidents over a period of years is the error made in approach and landing during poor weather conditions. If this factor were eliminated about 40% of fatal or potentially fatal airline accidents would go with it. Further improvement will result in the future by advances in methods for selecting personnel, refinement in training methods and maintenance of pilot proficiency, the establishment of improved systems to obtain closer control over the quality of performance and fundamentally a recognition by designers of the fact, easily proven, that pilots and mechanics are human. Being human they are subject to fatigue, strain, forgetfulness and other causes of error in action. Designers must give as much emphasis to the human factors as to performance and structural integrity.

► **Employee Safety**—Before leaving the airline safety picture we should touch upon the methods used to measure the safety of airline personnel. We mentioned before that the pilot and other crew members should reckon their safety on the basis of pilot fatalities per hour of exposure (per 1000 hours is commonly used). The Actuarial Society of America has published a death rate of about .005 per thousand hours of flying or about one fatality per 200,000 hours for an airline pilot. Since he flies no more than 1,000 hours per year, he would have to fly 200 years before meeting with a fatal accident.

The yardsticks used to measure the safety of airline ground personnel are the same as used for all other industries: frequency of accidents and severity of accidents based on man hours of exposure. In both respects the air transport industry is not doing so well. The number of disabling injuries per 1,000,000 man hours is 17.55. The rate for all industries is 14.16. The severity rate is based on days lost per 1,000 man hours. Air transport is again doing poorly with a rate of 1.92 against an all industry average of 1.28. Even the shipbuilding, petroleum and iron and steel products industry do better than the airlines. On the other hand, the aircraft manufacturing industry does very well being amongst the safest industries in which to work.

► **Non-Scheduled Air Carriers**—In 1946 the non-scheduled air carriers were involved in eight fatal accidents (killing 19 crew members and 58 passengers). Their fatality rate based on the CAB estimate of 375,000 hours flown is therefore .21 fatal accidents per 10,000 hours. Scheduled air carriers had a rate of .04 per 10,000 hours or five times better than the non skeds. However, there is great variation between the quality of management and operation of non-scheduled air carriers. Some have excellent records and should not be linked with the whole lot.

Mishaps such as taxiing into buildings or other aircraft, wing damage, losses by ground fire, damage to aircraft done by trucks, by scaffolds and other sources of aircraft losses have not been included here because life expectancy would not permit it.

► **Personal Flying** (Including Charter, Fixed Base Operation, Private, Industrial Aid, etc.)—The public cannot trust accident statistics on personal flying to assess its risk in taking a flight with any random pilot that comes along, as they do with taxicab drivers or drivers of automobiles. The public would be safe if it could differentiate between the good and the bad. We all know of pilots with thousands of hours who have very fine safety records and there are flying school and charter operators with wonderful safety records. The large corporations owning executive type aircraft have established excellent safety records. In personal flying discrimination is necessary for safety when one chooses to travel that way.

The accident rate in personal flying is much more difficult to evaluate than in scheduled airline transportation because the exposure records such as hours or miles flown, or passenger miles or even the number of certificated aircraft and pilots is not accurately known and can only be estimated.

The CAA has initiated a method for obtaining hours of exposure by a sampling process. This is a logical and commendable approach.

The results of their survey indicate that in 1946 there were about 9,800,000 hours flown in non-scheduled operations. The CAB estimates that of this total the non-scheduled air carriers flew 375,000 and non air carriers 9,425,000 hours. A breakdown of the latter was made by the CAB. Due to the overlapping use of aircraft, a number of assumptions, some of them probably open to debate, had to be made before arriving at the figures given in Table III.

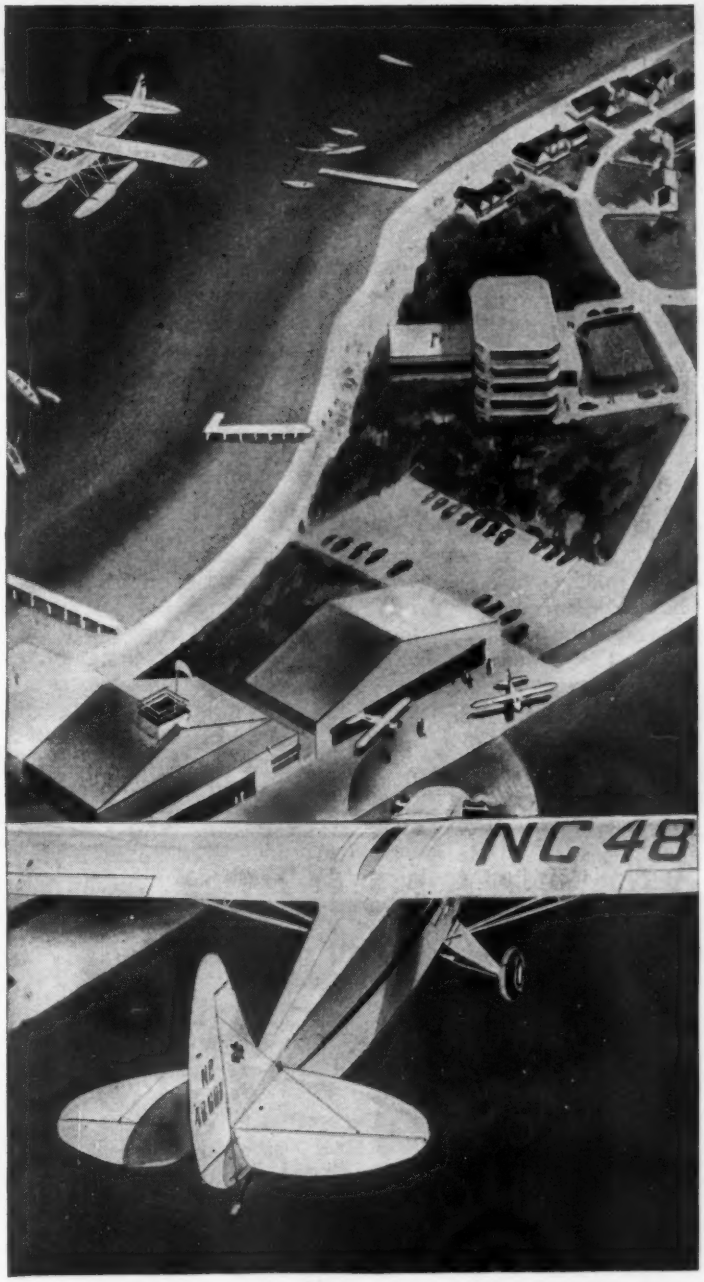
The scheduled airlines have an .04 fatality rate or about 30 times better than personal flying.

Probably the nearest accurate figure in personal flying is the number of registered aircraft. The average number in 1946 was 57,000. In that year, the latest year for which complete figures are available, almost 1200 people were killed in 690 fatal accidents. Therefore, one in every 85 airplanes was involved in a fatal accident, a shameful ratio considering the very limited use these airplanes get. Bad as it is, this is some improvement over the prewar (and pre

Table III—Private Flying Accidents

Kind of Flying	Estimated Aircraft Accidents per 10,000 Hr.		
	Fatal	Non-Fatal	Total
Instructional	0.3	4.8	5.1
Non-Commercial	1.3	10.8	12.1
Commercial and Miscellaneous	1.7	12.1	13.6

HALLMARK OF QUALITY AVIATION PRODUCTS!



Mobilgas
AIRCRAFT

The Flying Red Horse!

No wonder owners of commercial and private planes *trust* the Flying Red Horse trademark! They know it stands for dependable aviation fuels, lubricants, hydraulic fluids—backed by 82 years' experience and leadership in the petroleum industry!

Socony-Vacuum pioneered many advancements like the "Magic Bead" Catalyst—the TCC Process for continuous refining—that helped revolutionize flying safety and performance!

Today, more U.S. airports display the Flying Red Horse Shield than any other oil company trademark. More than 1000 important, strategically located airfields put Socony-Vacuum products always within cruising range!

And, for the future, many *new* developments are in the making. Even now, Socony-Vacuum scientists are hard at work studying new fuels for jet propulsion and the supersonic planes to come!

SERVES EVERY BRANCH OF AMERICA'S AIR INDUSTRY!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

CPT) years when one out of every 55 airplanes was involved in a fatal accident. From the advent of the CPT program to the end of the war, the record was much better than before or after (about one in every 115 aircraft involved in a fatal accident). This was due to the rerating of instructors and tight control by CPT during the very active years of 1940-1942 and the restrictions, gas rationing, use of only designated airports during the later years of the war. Even on the basis of the best record, if there were as many personal aircraft as automobiles we would have about 300,000 fatal accidents per year and kill 500,000 people. This comparison, ridiculous as it may be, emphasizes the point that if the public knew the true rate of fatalities in private flying, this class of flying would not have much chance of survival. The accident rate in personal flying is not of a magnitude that the public would accept if they knew how bad it was. It is the reverse of the airline picture where the accident rate is good but the public looks askance.

The stall spin must be removed as a cause of fatal accidents but even with that out of the way, the fatal accident rate would still be bad. Stalled spins account for about 45-50 percent of fatal accidents so their absence would involve about one aircraft in every 150 in a fatal accident instead of one in 85.

For purposes of comparison about one in every 3,000 automobiles is involved in a fatal accident each year.

I mentioned before that the fatality rate of airline pilots is about .005 per thousand hours. The comparable figure for the private pilot is difficult to determine accurately but according to the Actuarial Society of America it was about .125 per 1000 hours, in the period 1937-1940 or 25 times more dangerous than the airline pilot. A private pilot flying as many hours per year as an airline pilot should be dead statistically in ten years. The rate for commercial pilots was about .045 and the rate for instructors .06. The closely supervised CPT program improved the fatality rate for both students and instructors to about .01 per 1000 hours which is a remarkable improvement. The Actuarial Society of America says that "There is great improvement in safety where close governmental supervision is exercised, with little or no tendency to improvement in those types of flying where there is no supervision other than the general requirements of Civil Air Regulations."

The fatality record in personal flying is bad enough but the overall loss record is also very poor. Each year about one in every eight aircraft is involved in an accident reported to the C.A.A. This does not include losses due to windstorm, hangar fire, carelessness and numerous other causes of ground damage. The truer figure is that one in every five, possibly one in every four aircraft is involved in loss each year.

In personal flying, the fatality record can be reduced by almost 45% if the stall spin could be averted. This and a campaign against low flying to reduce collisions with trees, mountains and other objects on the ground would attack another 25% of the fatal accidents occurring in personal flying. The rerating of instructors, the general tightening of training procedures appears very necessary. As in air transport design, the design engineers should recognize the problem of safety created by human limitations and carelessness.

Fatality records for both personal flying and airline flying would be improved if the work of the Crash Injury Research Division of the National Research Council were more adequately encouraged, supported and followed by the aviation industry.

▶ **Summary**—The completely proper yardstick used to measure safety in aircraft operations has not yet been found and further exploration is desirable. But whatever yardstick is selected, its principal use will be to determine trends rather than assessment of exposure to accident inasmuch as the airlines record for safety is within the public concept and acceptance of safety in other fields of activity. Airline safety is of the same general magnitude as any other form of transportation. The record could be improved greatly by attacking one or two outstanding causes.

The injury record for ground personnel employed by the airlines is poor relative to other hazardous industries. The average record for non scheduled air carriers is not as good as the airlines but great variation in company management within that group invalidates the use of rates or statistics to secure a true picture of their safety. This is also true of personal flying where safety is dependent on discrimination but there are sufficient numbers in this category to conclude that as a whole personal flying has a long way to go before it will be completely accepted by the public as a safe means of transportation.

(Based on a paper presented at 16th Annual Meeting of the Institute of the Aeronautical Sciences.)

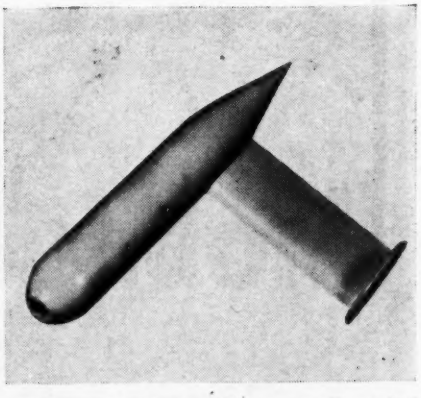
Temperature-Probe Gives High Accuracy

Automatic temperature probe, suitable for aviation flight testing in conjunction with temperature recording and transmitting devices in guided missiles, radio controlled planes, and with other test-craft in speed ranges above 400 mph., has been designed by Dr. W. L. Howland, chief of Lockheed's Flight Instrument Research.

Manufactured by G. M. Giannini and Co., Pasadena, Cal., this instrument —type 4915 Autoflight temperature probe—simplifies data reduction by measuring the total air temperature (ambient air temperature plus 100 percent of the temperature rise due to velocity). Flight test engineers today are confronted with corrections for partial adiabatic rise when using other types of temperature recorders. The theoretical calculations for complete adiabatic rise are much simpler to calculate.

The temperature probe reduces the total time required to complete a flight test since the test-aircraft does not slow down for temperature readings. Two major features eliminate position errors and other inaccuracies: (1) All velocity energy is converted to temperature and (2) the instrument readings are protected against conduction losses and radiation inaccuracies by proper shielding design.

The probe is about six inches long, one inch in diameter. It can be boom-



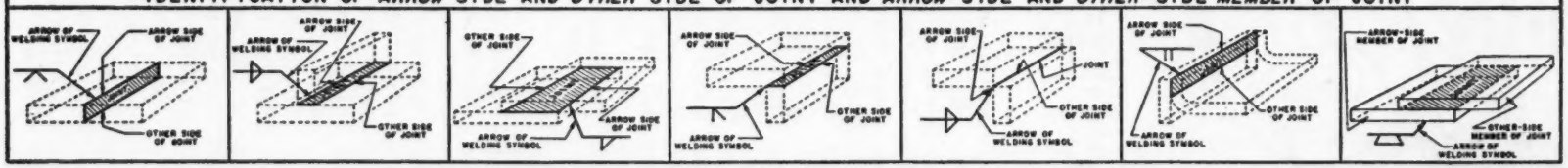
or strut-mounted with a small airfoil section supplied by the manufacturer. In operation, air enters the nose of the probe and flows around a resistance bulb, or thermocouple.

Ranges of the visual and photopanel recording are: Temperature range, −65 deg. to +145 deg. C; type of element, resistance; overall resistance, 100 ohms, .2 ohms allowed in indicator for lead resistance (B & S 18 wire recommended for leads); accuracy; ±½ deg. C.; stabilization time, ±1 sec.; type of indicator, standard Lewis Engineering Co. voltage ratiometer (uses aircraft power supply and will not vary with normal voltage changes).

Oscillographic, the Brown, or Lewis potentiometer recording ranges are: Temperature, −70 to +100 deg. C.; type of element, thermocouple; Emf, 2.8 mv.; accuracy, ±½ deg. C.; stabilization time, less than 1 sec.

SUMMARY OF STANDARD WELDING SYMBOLS

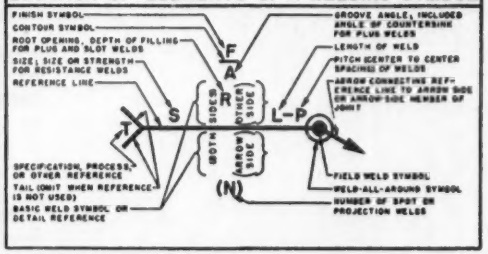
IDENTIFICATION OF *ARROW* SIDE AND *OTHER* SIDE OF JOINT AND *ARROW*-SIDE AND *OTHER*-SIDE *MEMBER* OF JOINT



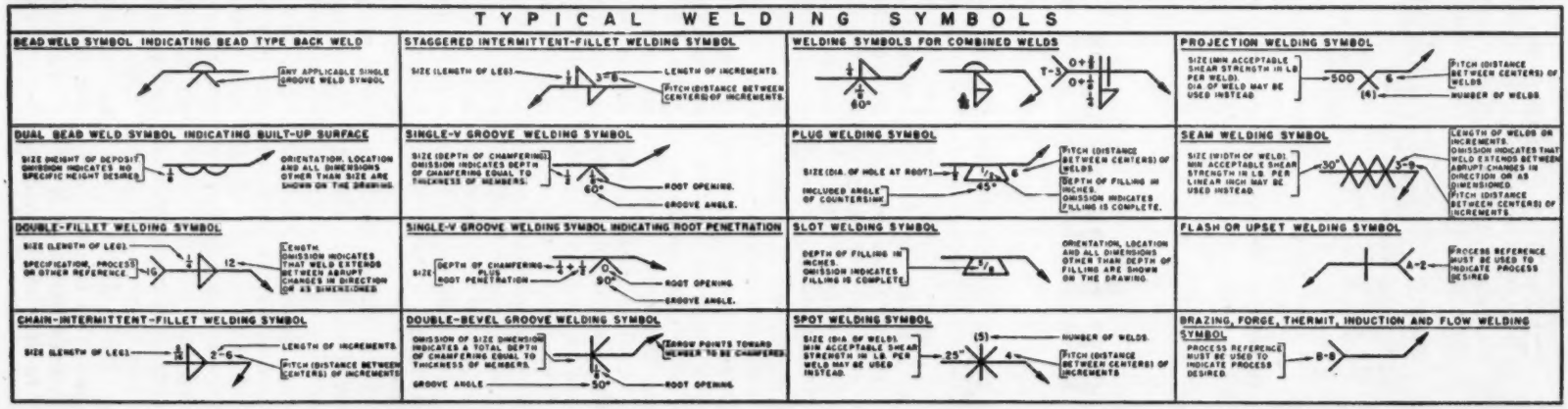
BASIC WELDING SYMBOLS

LOCATION SIGNIFICANCE	ARC AND GAS WELDING SYMBOLS								RESISTANCE WELDING SYMBOLS			
	BEAD	FILLET	PLUG OR SLOT	GROOVE: SQUARE	GROOVE: V	GROOVE: BEVEL	GROOVE: U	GROOVE: J	PROJECTION	SPOT	SEAM	FLASH OR UPSET
ARROW SIDE	GROOVE WELD SYMBOL									NOT USED	NOT USED	NOT USED
OTHER SIDE	GROOVE WELD SYMBOL									NOT USED	NOT USED	NOT USED
BOTH SIDES	NOT USED		NOT USED						NOT USED	NOT USED	NOT USED	NOT USED
NO ARROW-SIDE OR OTHER SIDE SIGNIFICANCE		NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED			

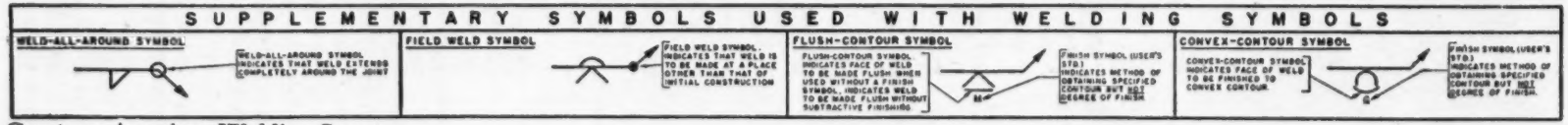
LOCATION OF ELEMENTS OF A WELDING SYMBOL



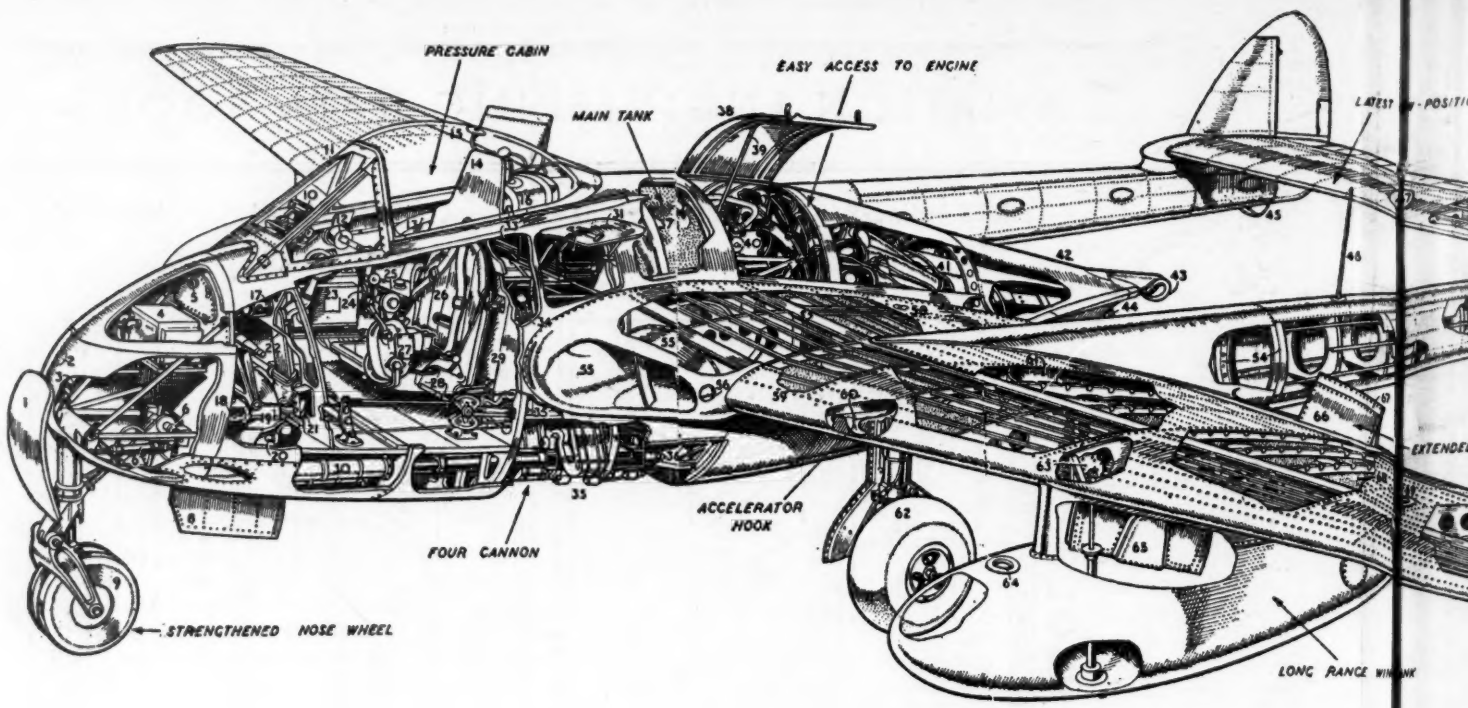
TYPICAL WELDING SYMBOLS


BEAD WELD SYMBOL INDICATING BEAD TYPE BACK WELD
ANY APPLICABLE SINGLE GROOVE WELD SYMBOL
STAGGERED INTERMITTENT-FILLET WELDING SYMBOL
SIZE (LENGTH OF LEG)
LENGTH OF INCREMENTS
PITCH (DISTANCE BETWEEN CENTERS) OF INCREMENTS
WELDING SYMBOLS FOR COMBINED WELDS
PROJECTION WELDING SYMBOL
SIZE (MIN ACCEPTABLE SHEAR STRENGTH IN LB PER WELD). DIA OF WELD MAY BE USED INSTEAD
PITCH (DISTANCE BETWEEN CENTERS) OF WELDS
NUMBER OF WELDS
DUAL BEAD WELD SYMBOL INDICATING BUILT-UP SURFACE
SIZE (HEIGHT OF DEPOSIT) OMISSION INDICATES NO SPECIFIC HEIGHT DESIRED
ORIENTATION, LOCATION AND ALL DIMENSIONS OTHER THAN SIZE ARE SHOWN ON THE DRAWING.
SINGLE-V GROOVE WELDING SYMBOL
SIZE (DEPTH OF CHAMFERING) OMISSION INDICATES DEPTH OF CHAMFERING EQUAL TO THICKNESS OF MEMBERS.
ROOT OPENING.
GROOVE ANGLE.
PLUG WELDING SYMBOL
SIZE (DIA. OF HOLE AT ROOT)
INCLUDED ANGLE OF COUNTERSINK
PITCH (DISTANCE BETWEEN CENTERS) OF WELDS
DEPTH OF FILLING IN INCHES. OMISSION INDICATES FILLING IS COMPLETE.
SEAM WELDING SYMBOL
SIZE (WIDTH OF WELD). MIN ACCEPTABLE SHEAR STRENGTH IN LB PER LINEAR INCH MAY BE USED INSTEAD.
LENGTH OF WELDS OR INCREMENTS. OMISSION INDICATES THAT WELD EXTENDS BETWEEN ABRUPT CHANGES IN DIRECTION OR AS DIMENSIONED.
PITCH (DISTANCE BETWEEN CENTERS) OF INCREMENTS
DOUBLE-FILLET WELDING SYMBOL
SIZE (LENGTH OF LEG)
SPECIFICATION, PROCESS OR OTHER REFERENCE
LENGTH. OMISSION INDICATES THAT WELD EXTENDS BETWEEN ABRUPT CHANGES IN DIRECTION OR AS DIMENSIONED
SINGLE-V GROOVE WELDING SYMBOL INDICATING ROOT PENETRATION
SIZE
DEPTH OF CHAMFERING PLUS ROOT PENETRATION
ROOT OPENING.
GROOVE ANGLE.
SLOT WELDING SYMBOL
DEPTH OF FILLING IN INCHES. OMISSION INDICATES FILLING IS COMPLETE.
ORIENTATION, LOCATION AND ALL DIMENSIONS OTHER THAN DEPTH OF FILLING ARE SHOWN ON THE DRAWING.
FLASH OR UPSET WELDING SYMBOL
PROCESS REFERENCE MUST BE USED TO INDICATE PROCESS DESIRED
CHAIN-INTERMITTENT-FILLET WELDING SYMBOL
SIZE (LENGTH OF LEG)
LENGTH OF INCREMENTS
PITCH (DISTANCE BETWEEN CENTERS) OF INCREMENTS
DOUBLE-BEVEL GROOVE WELDING SYMBOL
OMISSION OF SIZE DIMENSION INDICATES A TOTAL DEPTH OF CHAMFERING EQUAL TO THICKNESS OF MEMBERS.
ARROW POINTS TOWARD MEMBER TO BE CHAMFERED.
GROOVE ANGLE
ROOT OPENING.
SPOT WELDING SYMBOL
SIZE (DIA OF WELD). MIN ACCEPTABLE SHEAR STRENGTH IN LB PER WELD MAY BE USED INSTEAD.
NUMBER OF WELDS.
PITCH (DISTANCE BETWEEN CENTERS) OF INCREMENTS
BRAZING, FORGE, THERMIT, INDUCTION AND FLOW WELDING SYMBOL
PROCESS REFERENCE MUST BE USED TO INDICATE PROCESS DESIRED

SUPPLEMENTARY SYMBOLS USED WITH WELDING SYMBOLS


WELD-ALL-AROUND SYMBOL
WELD-ALL-AROUND SYMBOL INDICATES THAT WELD EXTENDS COMPLETELY AROUND THE JOINT
FIELD WELD SYMBOL
FIELD WELD SYMBOL. INDICATES THAT WELD IS TO BE MADE AT A PLACE OTHER THAN THAT OF INITIAL CONSTRUCTION
FLUSH-CONTOUR SYMBOL
FLUSH-CONTOUR SYMBOL INDICATES FACE OF WELD TO BE MADE FLUSH WHEN USED WITHOUT A FINISH SYMBOL. INDICATES WELD TO BE MADE FLUSH WITHOUT SUBTRACTIVE FINISHING
FINISH SYMBOL (USER'S STD.) INDICATES METHOD OF OBTAINING SPECIFIED CONTOUR BUT NOT DEGREE OF FINISH
CONVEX-CONTOUR SYMBOL
CONVEX-CONTOUR SYMBOL INDICATES FACE OF WELD TO BE FINISHED TO CONVEX CONTOUR.
FINISH SYMBOL (USER'S STD.) INDICATES METHOD OF OBTAINING SPECIFIED CONTOUR BUT NOT DEGREE OF FINISH.

Courtesy, American Welding Society



Newer English Jet-Type Fighters Delayed

If there ever was any complacency in England about the alleged British lead in the field of jet propulsion, it has certainly disappeared almost completely during recent months, confronted by the rush of new American jets taking to the air.

On the other hand, there are several new and promising British jet airplanes flying, to our certain knowledge, and the occasional peeps behind the iron curtain of security which we sometimes manage to get reveal some surprisingly advanced design thinking.

▶ **British Jet Details**—Firstly, several British jet craft in the news during the latter half of 1947 serve as pointers to future trends. One of England's most promising air speed record contenders is the third sweptback wing de Havilland D.H. 108, number VW 120, which is continuing basic research for the D.H. 106 Comet jet airliner with a similar wing configuration.

A lot of experimental flying has been done during 1947 on VW 120, though not yet at ultra-high speeds, and we can confidently predict that this airplane is much faster than the 640 mph. (at least) attained by the ill-fated second machine in which Geoffrey de Havilland lost his life. Better performance is the result, primarily, of cleaner nose and cockpit hood lines, and to a "souped-up" Goblin IV giving over 3,300 lb. thrust.

▶ **Crash Analyzed**—The accident, over the Thames Estuary, to the second D.H. 108 is thought to have been caused by the nose wheel door being sucked away at near-sonic speed—the resulting terrific inrush of air causing something in the nature of an explosion and wrenching off the wings. Certainly, the nose wheel door on VW 120 hinges partly within the nose instead of attaching to the wheel strut and when closed is braced against any aerodynamic suction by the surrounding structure. Ribs and the fuselage-wing attachment points, rudder hinges, and certain internal bulkheads are also strengthened. Under favourable conditions, this airplane should be a certainty for a successful record attempt.

Latest D.H. service jet, incidentally, is the Vampire Mk. III long range interceptor, with the new Goblin III rated at 3,300 lb. thrust, and an altered tail. Top speed is 531 mph. and maximum range 1,145 mi.

▶ **Carrier Gear Factors**—Deck trials last October of the Naval Supermarine Attacker are of interest in that they refute the alleged unsuitability of the tail wheel landing gear for carrier-borne aircraft. The tricycle's advantages on land are undisputed, but on a carrier deck the nose wheel is apt to be a weak spot under heavy landing shocks, deck hooks are more difficult to locate, and new landing technique must be learned.

Another point worth noting concerning the Sea Attacker is that lift spoilers are used to control approach runs, rather than throttle movements. Thus, high revs. are maintained while landing so that instantaneous power is available from the jet engine should a "wave-off" be given by the signal man. These two items may influence future Royal Navy designs.

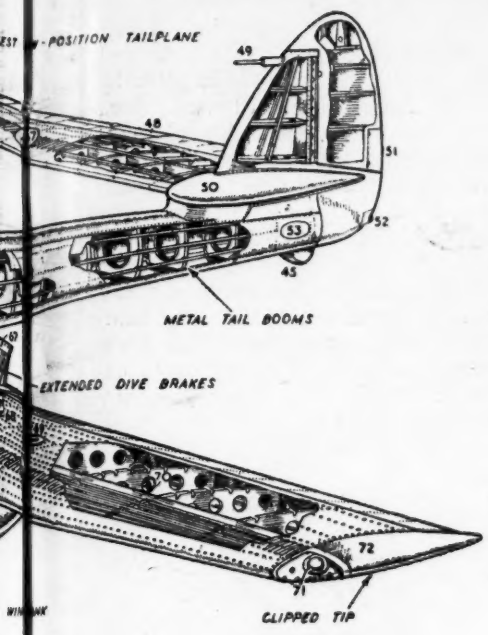
▶ **All-Wing Influence**—Greatest significance, however, may be afforded by the first flights of the near-all-wing Armstrong-Whitworth A.W. 52, which, with two 5,000 lb. thrust Rolls-Royce Nenes, does an estimated 500 mph. at sea level and 20,000 ft., and has a maximum range of 1,500 mi. at 36,000 ft. at 330 mph.

This machine is purely for research purposes, and is the first of several unorthodox types evolved in accordance with the Ministry of Supply's new policy of building actual aircraft to test new ideas, rather than rely entirely on static research facilities.

The configuration is the thing to watch, however, and we shouldn't be surprised to see some of the new types under development with similar all-wing layout. Armstrongs themselves have an all-wing on the stocks grossing 200,000 lb.

▶ **Types for 1948**—Review, as far as security permits, of British military and naval jets just flown or likely to be flown in 1948 is as follows:

A.W. 52—all-wing research aircraft.
Avro Athenea I—jet trainer.
Blackburn Y.A. 5—Navy strike.
Boulton Paul Balliol—jet trainer.
D.H. Vampire V and VI—ground attack.



SEA VAMPIRE MARK XX

1. Nose-wheel fairing panel; 2, Camera port; 3, De-icing spray hand-pump reservoir; 4, I.F.F. set; 5, Ground-test charging-point for pressure system set in armour door giving access to rear of instruments; 6, Nose wheel retracting mechanism and jack; 7, Gun ports; 8, Nose-wheel fairing door; 9, Nose-wheel with double-tread tire; 10, Gyro gunsight; 11, Shatterproof front windshield panel; 12, Hood winding handle; 13; Air trunk from pressure-cabin blower; 14, Armour headplate; 15, Double-walled sliding hood and de-mister connection; 16, Hydraulic tank; 17, Instrument panel (cut away to show cockpit interior); 18, Adjustable rudder pedal; 19, Nose-wheel housing well; 20, Air bottle; 21, Radio controller; 22, Control column; 23, Map case; 24, Hot-cold air control; 25, Oxygen economiser; 26, Pilot's adjustable seat; 27, Engine controls, trim, dive brakes, under-carriage, and flaps controls quadrant; 28, Long-range tanks jettison lever; 29, Rear armour plate; 30, Cannon blast tubes; 31, Radio access door; 32, Radio; 33, Beam-approach radio; 34, Oxygen bottles; 35, Two port 20-mm. cannon, feed mechanisms, and ammunition boxes; 36, Batteries; 37, Fuselage fuel tank (96 gal.); 38, Port top hinged access panel to engine; 39, Stay rod, holds access panel in open position; 40, Engine accessories; 41, Tailcone and lift point; 42, Built-up rear fuselage to house deck hook; 43, Deck hook; 44, Jet tail pipe; 45, Tail bumpers; 46, Aerial (beam aerial is beneath starboard boom); 47, Elevator mass balance; 48, Trim tab; 49, Pitot head; 50, Tailplane-fin fairing; 51, Rudder trim tab; 52, Navigation light; 53, Inspection panels in tail boom; 54, Tail boom to wing joint; 55, Port air intake to Goblin engine; 56, Pressure-cabin blower air intake; 57, Main spar; 58, Port center-section tank (53 gal.); 59, Leading-edge flexible long-range tank; 60, Accelerator hook; 61, Port wheel well; 62, Main wheel; 63, Wing jettison tank suspension point and release; 64, Filler cap; 65, Altered wheel fairing door; 66, Dive brake; 67, Dive-brake extension; 68, Outer wing long-range tanks; 69, Wing-tank filler cap; 70, Landing lamp (R. I. compass on starboard side); 71, Navigation lamp; 72, Wing clip-off.

...ed Until 1950

On-the-spot observer appraises current status of the British design and research program.

Sea Vampire XX and 21—Navy interceptors.

Gloster Ace—fighter.

Hawker N 7/46—Naval fighter.

Saro S. R/45—flying boat fighter.

Supermarine Swift—research.

▶ **Turboprop Designs**—Both the Balliol and the Athenea are turboprop designs conforming to the Royal Air Force's new three-seat trainer policy. The Armstrong-Siddeley Mamba (1,010 shp. + 320 lb. thrust), Rolls-Royce Dart (1,000 shp. + 325 lb. thrust), and possibly the Napier Naiad (1,500 shp. + 240 lb. thrust) turboprops will power later versions of these trainers, although initial production machines will have 1,280 hp. Merlin 35 piston engines.

▶ **Jet Design**—Vampires V and VI are specially strengthened, high performance, Goblin III-powered assault versions of the standard model, Mk. V going to the Royal Air Force and Mk. VI to the Swiss. Among other things, these have stiffened wings and undercarriage to take underwing loads, clipped wings, and braced fuselage tank to withstand pull-out shocks.

New Navy Vampires are the Mk. XX, similar to the Mk. V but with Navy gear, and Mk. 21, six of which are on order for significant new deck landing experiments. These marks, we should imagine, will be the last in the Vampire line, and will tide the Services over until advanced types come into operation.

Two of these latter may be the Nene-powered, single-seat Gloster Ace fighter, and the 600-mph.-plus Hawker N. 7/46 Navy fighter, also with the Nene. The Hawker is interesting in that it has twin wing-root air ducts and two separate outlets for the single Nene jet.

Production versions of Saro's S. R/45 single-seat flying boat fighter will mount twin Metrovick Beryl axial-flow turbines each giving 3,850 lb. thrust, and four-cannon armament. These boats, first of their kind in the world, will be attached to the Royal Air Force, and represent a new class visualized in 1944 and intended for the Far East war.

Blackburn's turboprop Y.A. 5 is an extension of the Centaurus-powered Firecrest strike single-seater, and uses a similar gull wing. The Y.A. 5, due for completion next December, is one of a series of jets on the boards or being built for the Navy—some of very advanced design.

An interesting variation on the 590-mph. Supermarine Attacker fighter will be the Swift research airplane with sweptback wings and tail.

With its present wing layout, the Attacker cannot make full use of the Nene's power and will not serve with the Royal Air Force in its present form.

▶ **Super-Speed Research**—Near-sonic and supersonic research with piloted aircraft has been abandoned for the time being owing to a tragic fatality, and a program of tests with remotely controlled aircraft such as the Vickers missile is under way, though without any great initial success. Present British ideas on supersonic configurations favour the all-wing layout, according to the Ministry of Supply's chief scientist, Sir Ben Lockspeiser.

▶ **Engine Picture**—The jet engine position is likewise shrouded in secrecy just now. Present most powerful production engine is the Rolls-Royce Nene, which will take immediate care of the 5,000-5,500 lb. thrust class. From there upwards to 8,000 lb. thrust, several new turbines, axial and centrifugal, already running under test will take over, with still bigger engines in the design and development stage.

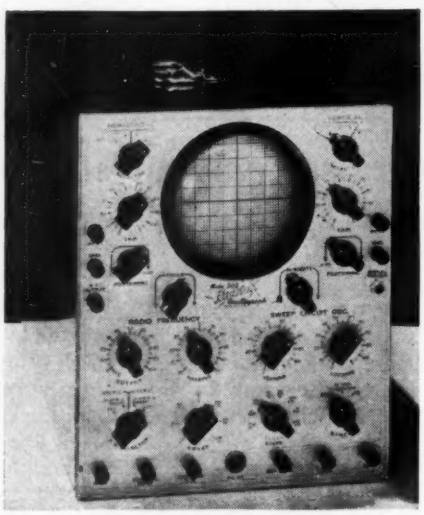
Policy here seems to have been to get a quick start with the Whittle-type centrifugal flow engine for immediate purposes, and to develop slowly and carefully the axial flow type in big sizes and powers to back up this initial lead.

Any survey of new British jets made within the strict limits of Air Ministry and Navy security tends to give a misleading picture compared with the latest American announcements. However, one basic trend may be observed, and that is that in the main, British air authorities are making do for the time being with present equipment, while in the background energetic research is proceeding in new and basic spheres. First indications of this policy may be seen in 1948, but perhaps not until 1950 will the new air services begin to take coherent shape. —**Roy Cross**

NEW AVIATION PRODUCTS

Cathode Ray Oscillograph

Of interest to aviation radio personnel is Model 505 oscillograph, using new 5 UP-1 tube with 5-in. screen, made by **Hickok Electrical Instrument Co.**, 10619 Dupont Ave., Cleveland 8, Ohio. Stated to cut radio trouble-shooting time, device is recommended for servicemen for generating FM signal, aligning IF and RF transformers, and discriminator circuits. Operator can also visually analyze each section of receiver, check for gain, and trace signal



through receiver. Included is wide and narrow band FM oscillator; wide band, high gain vertical amplifier, to 1 mc.; modulation circuit, permits FM oscillator to be modulated internally or from outside source (makes FM oscillator into miniature FM transmitter); self-contained mixer circuit, permitting FM output with any good signal generator; demodulator, allows any modulated RF signal to be viewed; Signal tracer jack, permits any signal being viewed to be heard by phones; and sinusoidal sweep with phasing control.

New Rubber Developed

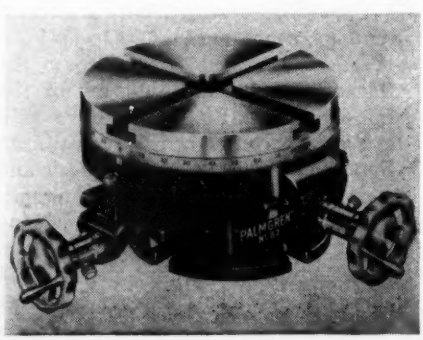
Seen as having range of aircraft applications, latest type American rubber, Hycar P.A., developed by **B. F. Goodrich Chemical Co.**, Cleveland, Ohio, can be compounded and vulcanized in wide range of soft to hard compositions. Identified as polyacrylic ester, elastomeric material resembles natural, pale crepe rubber. Available in dry and latex forms, material in unvulcanized state is expected to find many applications as adhesive and as coating or impregnant for fabrics. Vulcanized products are stated to have shown outstanding performance as heat-resistant coatings on fabrics, heat and oil-resistant gaskets, hose, and oil seals. Other uses are seen as insulation coating on motor coils, and as a heat and oil resistant jacket for wire. Tests under electric iron at 400° F. for 8 hr. are claimed to have showed no apparent loss in properties, whereas older type rubber compounds were completely deteriorated in much shorter time. After 720 hr. at 300° F., material shows 35% change in elongation in comparison with 75% in 7 hr. for good rubber compounds. Ozone resistance is stated as even more striking, 600 hr. exposure showing less effect than 6 sec. exposure on rubber.

Light Metal Washer

Aluminum spring lock washer, known as Diamond G, for light metal assemblies, is announced by **George K. Garrett Co.**, 1421 Chestnut St., Phila., Pa. Stated to have advantages of light weight, corrosion resistance, and strength and tension of bronze or stainless unit, device is available in all standard and special sizes.

Makes Milling Easier

For production activities, new Palmgren No. 82 indexing and cross slide table with graduated rotary top is offered by **Chicago Tool & Engineering Co.**, 8383 South Chicago Ave., Chicago 17, Ill. Table top can be rotated manually or locked in position. Table is 8 in. in dia. and T slots are provided for mounting parts and fixtures. Cross travel by feed screws is calibrated in thousandths. Adjustable gibs are provided for wear take-up. Maximum travel of 4 in., plus 360-deg. rotation of 8-in. table top, gives tool adaptable to many operations. Base has four bolt and key slots for rigid mounting to table of milling machine, drill press, shaper, or surface grinder.



Dry-Chemical Extinguisher

Stated to perform effectively under all climatic conditions and in winds and drafts, 10-lb. fire extinguisher made by **All-Out Mfg. Corp.**, 10 Park Ave., New York City, ejects dry chemical under pressure, in a flat powder stream that separates flame from burning material, forming dense, fire-smothering cloud over fire area, up to 18-ft. distance. It's stated that insulating barrier is created between operator and flame providing protection from radiant heat. Other features claimed: No toxic gases, nonconductor of electricity, nonabrasive, removable with brush, and easy recharging.

Information Tips

Aviation Fuel and Lube Data

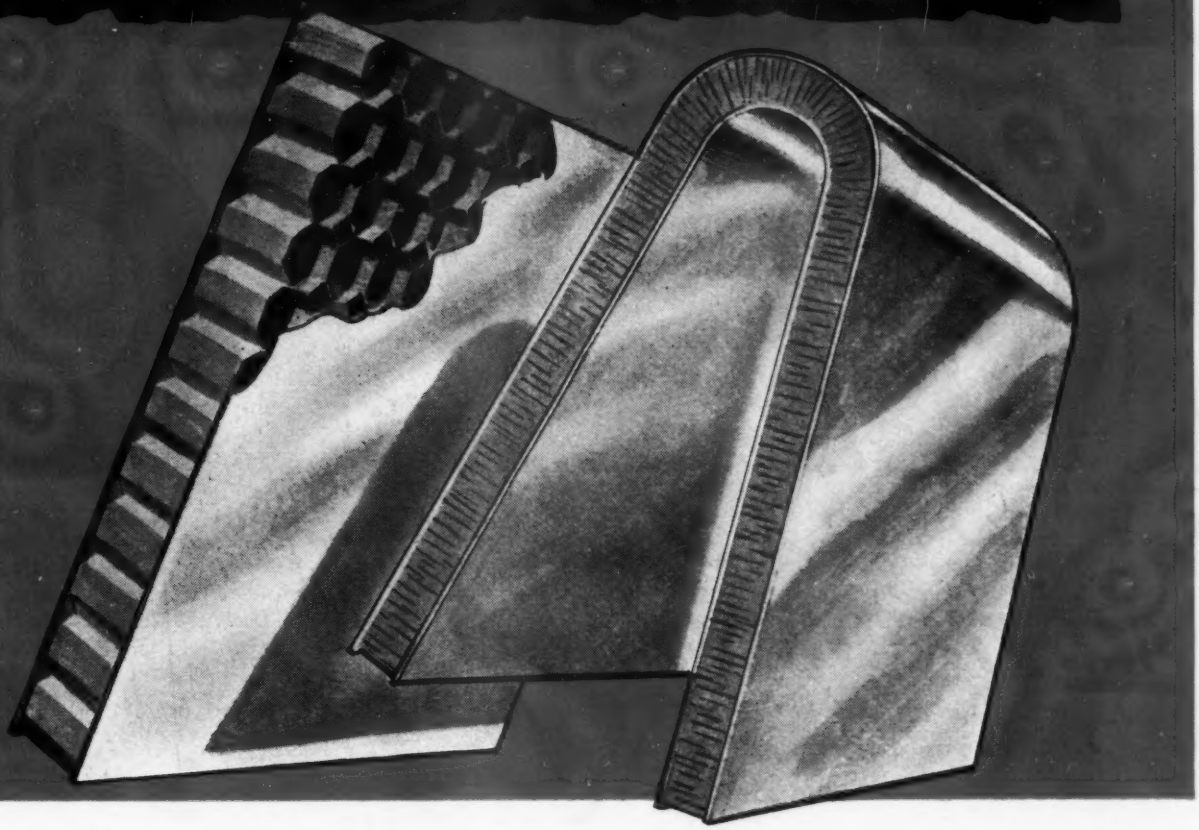
American Society of Testing Materials, 1916 Race St., Phila., 3, Pa. issues greatly expanded 1947 volume titled "Standards on Petroleum Products and Lubricants," covering over 700 pages and containing over 130 test methods, specifications, and definitions. Included are tests and specifications for aviation fuels, diesel fuels, and kerosene, and tests for lubricating oils, grease, petrolatums, electrical insulating oils, and hydrocarbon solvents. Price is $4.75 in paper cover, $5.40 in cloth binding. New ASTM manual, "Engine Test Methods for Rating Fuels" is being prepared for issue this month.

Welding Data Compiled

Production engineers and personnel concerned with welding aspects of aircraft industry will find value in 67-page handbook entitled "Standard Welding Symbols and Rules for Their Use." Issued by **American Welding Society**, 33 West 39th St., New York 18, N. Y., this 1947 standard has been revised to step-by-step presentation in lecture-type form. Rules have been expanded to include means of indicating welds having root penetration. Other features are the dropping of confusing terms "near side" and "far side." Profusely illustrated, publication is priced at 50 cents. Compact summary chart of welding symbols (included in publication) will be available in large size for posting on wall of office or shop.

Are we "doing ourselves out" of some Aluminum Business

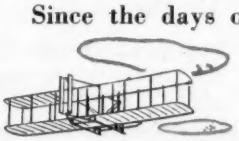
by Aiding in the Development of Sandwiches?



The light, high-strength "sandwich" materials in the forefront of today's aircraft development promise new highs in structural strength and stiffness per unit of weight. That means less aluminum to do a given job.

Is it good business for Alcoa to make a major contribution to such a development? We think so, and here's why:

Since the days of Kitty Hawk, Alcoa has had a part in virtually every airframe or power plant development where light metals were involved.



Alcoa's engineering, and research, and testing facilities have been applied to assisting with those developments, with a very important end in mind—to aid aviation's progress. Some, like the development of the all-metal airplane, have resulted in substantial aluminum tonnage. Others have resulted in no appreciable tonnage at all, but in *better aircraft.*

It is this spirit of working together that is stenciling the Alcoa name on the wide, thin sheets needed for the latest in "sandwiches". ALUMINUM COMPANY OF AMERICA, 2182 Gulf Building, Pittsburgh 19, Penna. Sales offices in principal cities.

ALCOA FIRST IN **ALUMINUM**

IN EVERY COMMERCIAL FORM

AUTO-MATIC

ALL THE WAY!

beam entry

drift correction

landing approach

range flying

beam bracketing

Pioneer* PB-10 Automatic Pilot and Flight Path Control

Airline operation takes a significant step forward with the use of the PB-10 Automatic Pilot with Flight Path Control. Unerring *automatic* range flight all the way, with *automatic* landing approach at destination, makes an actuality of every airline's fondest dream. Using established C.A.A. instrument landing system beams, the Control flies the airplane on smooth, sure flight over the VHF range, or down the glide path for an accurate approach right to the runway. The PB-10's action is gentle, but precise—as Flight Path Control compensates for drift to keep the plane in the exact center of the beam. Investigate the Pioneer PB-10 Automatic Pilot with Flight Path Control—it holds the answers to many of your airline problems!

*REG. U.S. PAT. OFF.

Eclipse-Pioneer
TETERBORO, NEW JERSEY

DIVISION OF Bendix AVIATION CORPORATION

Industry Challenges VA Threat To GI Flight Training Future

Congressional hearings focus on opposition to Veterans Administration handling of personal flying program; NASAO scores red tape.

By ALEXANDER McSURELY

Threats against continuance of the GI flight school program and other avocational training under the GI Bill of Rights are arousing strong opposition from all sections of the fixed base operator industry. There are also some indications of Congressional support for full continuance of flight training.

At hearings before the House Veterans Affairs Sub-committee on Education, Training and Rehabilitation, supervisory personnel of the Veterans' Administration has been subjected to strong attacks, both by Congressmen and by witnesses testifying against methods of administrating the cost analysis formula which VA is requiring of all private and proprietary schools.

▶ **Weichel Blast**—"VA has been operating the flight training program as a racket," Rep. Alvin Weichel (R., Ohio) told the sub-committee at a recent hearing. "I have been getting complaints about it for the last three years.

"Congress did not intend for the law to be administered like this. These underlings have set themselves up like little tin gods. A GI college student can take such an elective as music but if he wants to take a flight elective he is penalized," Weichel continued.

Albert Bachman of Bowling Green University board of trustees, who testified following Weichel, said that his school had given aviation training to over 1100 students during World War II and had been offering aviation courses since 1937. Currently 327 students are taking aviation training. There are only 15 or 20 who are wealthy enough to take it if the college ruling made by VA remains in force.

▶ **Gray's Decision**—Disclosure that Gen. Carl Gray, new Veterans' Administrator, has upheld H. V. Stirling, assistant administrator, in his ruling against flight training as a GI elective in college courses, was made to AVIATION WEEK last week. (For details of ruling see AVIATION WEEK, Nov. 17, 1947.)

Gen. Gray stated his position in a letter to the House Veterans Committee which said "I would not be justified in modifying the order."

Prospects for Congressional action to modify inequities of administration of the present GI program depended largely on amount of demand for such action. Rep. Homer A. Ramey (R., Ohio), chairman of the sub-committee, indicated at the hearing that he thought Gen. Gray "had already cleared up" the college order, but this was apparently misinformation in view of the Gray letter on file with the committee.

▶ **Congressional Support**—Rep. Georgia Lusk (D., N. M.), another member of the sub-committee, said she favored GI flight training and believed there should be a place for it in the educational system of this country. Another sub-committee member, Rep. Don Wheeler (D., Ga.), told the committee he had received "several bushels of mail and telegrams" wanting to know why he was torpedoing the GI flight program. "I'm not trying to torpedo it," he protested. "Thus far I haven't even opened my mouth on the subject."

In addition to mounting pressure on members of Congress from their home district aviation people for relief from present GI inequities, National Association of State Aviation Officials is urging action on GI flight training.

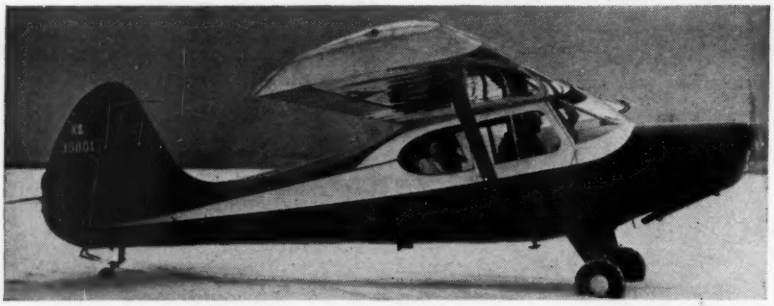
▶ **NASAO Stand**—NASAO President Clarence Cornish, Indiana State Aero-

GI School Hearing

Members of the House Sub-Committee on Education, Training and Rehabilitation (Veterans' Affairs Committee) have scheduled hearings on the GI flight training program beginning at 10 a.m. Friday, Feb. 20 in room 356, Old House Office Bldg., Washington, at which numerous members of the industry are expected to testify. Results of industry action here may determine the fate of GI flight training.

PRATT & WHITNEY "TEAM"

Four regional distributors of Pratt & Whitney engines met at Dallas, to form plans for national cooperation on parts inventory and other customer services, working with the Pratt & Whitney home office. Left to right: seated, Wallace O. Leonard, Burbank, Calif., president, Pacific Airmotive; George W. Jalonick, III, Dallas, vice-president, Southwest Airmotive; J. V. Thompson, Millville, N. J., president, Airwork Corp.; standing, Morris Trigg, East Hartford, Conn., service department, Pratt & Whitney division, United Aircraft Corp.; Wallace J. Clark, St. Paul, Minn., president, Northwestern Aeronautical Co.



AERONCA SEDAN PRICED AT $4,795

First photos of the new four-place 145 hp. Aeronca Sedan show features reminiscent of the two-place Areonca Champion in all around visibility but with somewhat less drag. Tail resembles the 1947 Stinson Voyager's tail. All-metal wing and single wing struts are innovations for Aeronca. Fuselage is the familiar fabric and steel tubing construction. Wide door provides easy access to cabin. Plane cruises at 112 mph. and is priced at $4795 flyaway Middletown, Ohio. (For additional details see AVIATION WEEK, Feb. 2.)

nautics Director, and NASAO Legislative Chairman Robert Dewey, Illinois Aeronautics Director, last week laid a 14 point NASAO proposal for aiding civil aviation before the Congressional board. A major point in the proposal concerned flight training for veterans.

Cornish pointed out that administrative decisions since the original act have made it virtually impossible for operators to develop specific flight training for veterans along with other flight courses for cash customers.

▶ **Changes Asked**—NASAO asked for a change in existing legislation to provide a new law for GI flight training, similar to Public Law 377 for on-farm institutional training. This would take flight training out from under the general Public Law 346 under which it is now administered. NASAO pressed for recognition of state supervision of flight training by aviation agencies, with advisory panels of aviation people from each state.

Current menace to continuance of GI flight training stems from President Truman's budget message which suggested elimination of much avocational training from veterans' education programs. An interpretation of his general remarks from the White House included flight training among the subjects recommended for elimination.

▶ **Local Support**—Local organizations representing various segments of fixed base operation and aviation training have been active in following the program since the budget message. State groups and regional meetings of operators point out the role the federally-financed program plays in keeping their operations from closing down. National representatives of the operators and flight schools, including National Aviation Trades Association, United Pilots & Mechanics Association, and Aeronautical Training Society, have been following closely progress of the hearings in Congress.

NASAO Hits At Finletter Report

Asking that the Congressional Air Policy Board take a more positive stand to assist other phases of Civil Aviation than the airlines, representatives of the National Association of State Aviation Officials last week criticized the President's Air Policy Commission report for its neglect of private flying, flight instruction, and other aviation phases.

NASAO officials, headed by Clarence Cornish, president, presented a 14 point program before the Congressional Board for promotion and development of "all" civil aviation, not "just the airlines."

The NASAO recommendations:

- Immediate creation of a state-local advisory panel for the Air Coordinating Committee.
- Creation of a permanent National Air Policy Council with representatives from Congress, federal agencies and states, to coordinate all civil aviation policy, and work first on a nationally coordinated safety program.
- Provide for state participation in determining domestic routes for air carriers, to insure local routes' serving areas properly. (Proposal suggested that states submit route plans, which should be accepted as correct, unless proved otherwise by evidence.)
- Amend Federal airport act to delegate CAA powers to the states, for accomplishment of specific projects within those states. (Prompt review of the existing airport act to attain greater economy and increase workability of act was asked.)
- Establish nationally coordinated aviation safety program, for non-scheduled aviation as well as airlines.
- Empower states to enforce CAR, including granting states the right to suspend or revoke airmen certificates.
- Grant Federal recognition of states' responsibility for investigating non-scheduled and personal plane accidents not involving structural failure, fire in the air, or midair collision.
- Keep CAA educational advisory service for aviation on an advisory basis.
- Continue veterans' flight training program under a modified plan. (See lead story Sales & Service section).
- Certificate-qualify manufacturers of personal aircraft, instead of requiring certification of individual planes.
- Arrange for long-term financing of privately operated airports open to public and for operating facilities at all airports open to the public. (Recommendation points out difficulties now encountered by owners of airports in getting funds for needed improvements. Suggested were small business loans on long-term basis by the Reconstruction Finance Corp. or other agency, with loans adequately secured.)

Plan Airfreight Terminal Near D. C.

Plans for construction of a major air port for airfreight and non-scheduled operations in the Washington, D. C., area in Charles County, Maryland, near Waldorf, have been announced by Potomac Airport Co., headed by Scott P. Appleby and J. Scott Appleby of Washington.

Initial construction stage calls for two 6,000 ft. hard surfaced runways at right angles. With warehouse and layover facilities designed for minimum tieups on hangar aprons, warehouses will be designed with motor truck docks to conform to standards of American trucking industry. Cold storage and bonded layover will be provided.

Airport is located for possible use as a feeder airline base, serving neighboring towns. Later stage of construction is planned to include passenger facilities and complete storage and maintenance service for personal and executive planes. Maintenance and service for larger four-engine and twin-engine transport types also will be provided. Clive Livesey will head the maintenance and service operation.

Parking and garages for maintenance and service to automobiles and trucks also are projected. Other plans for ultimate development of the airport will include hotel and recreational buildings, for people using the field, and a sales area with buildings displaying accessories and airplanes.

Gets Second Helicopter

The Oregon Journal, at Portland, has announced purchase of a second Bell helicopter to replace the one which crashed Dec. 21 during a pleasure flight, causing the death of C. S. Jackson, associate publisher, and another Portland businessman. The new machine, scheduled for delivery about Mar. 1, will be similar to the Model 47-B helicopter which crashed. Original Journal helicopter made 397 flights in 10 months, mostly for aerial news photography and news coverage missions. Pilot-reporter Joe Stein, who flew the first helicopter together with Jackson, will continue as pilot of the second aircraft.

Toledo Firm Announced

Aiken Aircraft Corp., Toledo, Ohio, incorporated for 250 shares of no par common stock, expects to be named distributor for Luscombe planes in 12 counties in northwest Ohio and southern Michigan. John E. Aiken, president, is also president and manager of Franklin Airport, Toledo.

BRIEFING FOR DEALERS & DISTRIBUTORS

NORTHWEST SHOW—Minnesota Aviation Trades Association is sponsoring the 1948 Northwest Aviation Exposition at Minneapolis Auditorium, Apr. 17-24, expected to be attended by approximately 60,000 persons. Exhibits will include personal and executive planes, helicopter, roadable and amphibian planes, and aircraft accessories, navigational aids, radios and airport equipment. E. H. Croft, Rochester, president; B. G. Vandre, St. Cloud, vice president; G. B. Van Dusen, Minneapolis, secretary; J. S. Irons, Minneapolis, treasurer; and Frank B. Cliff, executive director of MATA, are in charge of the show. Cliff has been named show manager.

SIDE-BY-SIDE—First Piper two-place side-by-side plane since the prewar Coupe is scheduled for announcement soon. Developed from the PA-11 tandem trainer, the new "Vagabond" two-placer is aimed at the farm market. It will have a large baggage compartment, minimum instruments and simplified control. Piper is shooting at a price near $2000. It may be the lowest priced plane on the market. Meanwhile reports indicate that four-place version of the well-known Piper Supercruiser is still a long way from entering the market. The three-place Cruiser will be the biggest Piper for some time to come. The new two-placer, the PA-11 tandem trainer, and the Cruiser can be expected to make up the Piper 1948 line until further notice. Piper at Lock Haven is back in production working on an export order of 300 planes, trainers and Cruisers for Argentina including 20 planes on floats.

SKYTEL NEAR SPOKANE—Spokane Valley Sky Ranch, Inc., has announced plans for construction of a Skytel for tourists flyers at Greenacres airport near Spokane with expenditure of $50,000. Plans call for six ranch-style living units to be ready by June followed by six others. A restaurant, an eight-plane hangar, and a car rental service for visiting pilots will be other features.

LUSCOMBE DELIVERIES—From standpoint of civil lightplanes sold in the two-place class, Luscombe Airplane Corp. points out that their planes ranked second in numbers to Cessna for this year. Luscombe also led in two-placer production and sales for the last three months of the year. Aeronca was placed ahead of Luscombe in a recent report on two-place production which gave Aeronca credit for its 516 L-16 two-placers in addition to its 1218 civil planes for a total of 1726 planes. A revised box score on the 1947 civil two-placer competition reads: Cessna, 2321; Luscombe, 1401; Piper, 1306; Aeronca, 1218. Additional production of Piper three-placers brought that company up to leadership in total planes produced with 3564 planes, as against 2662 by Stinson, the second place producer, and top dollar volume manufacturer for the year.

INTER CITY REOPENS—Inter City Aviation, Inc., at Logan International Airport, Boston, recently re-opened its hangar for transient flyers with auto rental service. Other facilities provided include cleaning interior of planes, windshield and windows, without charge, and minor repairs, gasoline and oil service are made available at all times.

"IN-AGAIN" HARRINGTON—After two years of aviation inactivity, J. R. (Bud) Harrington, former Mansfield, Ohio, municipal airport operator, is back in business with an operation at Hangar 9, Cleveland Municipal Airport. Harrington's new operation is concentrating on aircraft rentals, flight training and shop work, and does not represent any aircraft manufacturer. His equipment includes eight new smaller rental aircraft, including Four Aeronca Champions and a Chief, a 1948 Stinson Flying Station Wagon, a new Navion, a new Seabee, and for advanced flight training and charter flying a twin engine Cessna and a Douglas DC-3. Harrington operated for 15 years at Mansfield, before selling out his interest two years ago. After observing the intervening "shakedown period" he believes that the industry is now more clearly defined than it has been since war's end.

MIDAIR TREATMENT—A midair operation performed by a Vancouver, B. C., physician in an effort to save a victim of a logging accident, caused the patient to rally for a time, but he died next day in a Vancouver hospital. Dr. W. R. S. Groves, the physician, was aided by Denny Denroche, the pilot, who used one hand to operate controls of the Republic Seabee amphibian, used as the ambulance plane, and with the other hand held a blood plasma bottle. Denroche nosed the plane up to 3,000 ft. in an effort to escape turbulence, after Dr. Groves observed that the patient, George Martin, had lapsed into a coma during the flight. Martin suffered a leg fracture and serious internal injuries in the accident, about 200 miles north of Vancouver, and the ambulance plane was dispatched after a radio call for help.

—ALEXANDER McSURELY

FINANCIAL

Investment Trusts Slow to Shift In Aviation Securities Holdings

Analysis shows little change in position after 1946 liquidations; steadiness interpreted as possible evidence of faith in the future of the securities.

Investment trust which retained their interests in aviation shares at the end of 1946 did not disturb their positions during 1947, analysis of year-end portfolios discloses.

This action may be construed either as manifestation of some hope for the future or as an indication that paper losses were so great it was considered unwise to liquidate such holdings.

▶ **Aviation Investments Only**—National Aviation Corp. remains the only major trust with activities concentrated exclusively in the industry. A good many years ago, this trust attempted to diversify its investments among the securities on the broad industrial list, with aviation occupying a far less prominent position than it does at present. However, this course evidently was considered undesirable and during the past few years the trust has confined its investments to the aviation group.

Net assets of National Aviation aggregated $6,876,253 as of Dec. 31, 1947. This contrasts with a peak of $13,307,198 as of the 1945 year end and with $8,040,237 a year later. The subsequent decline is nothing more than a reflection of the fall of market values in aviation securities.

It is significant that the company's investment portfolio reveals a marked shift to aircraft shares during the year, rising from 21.0 to 33.4 percent. Airline shares increased only 1 percent to represent a total of 40.2 percent of total assets at the 1947 year end. These adjustments were made at the expense of cash balances which were reduced from 39.8 to 26.4 percent.

As of Dec. 31, 1947, the trust owned the following shares:

Aircrafts

22,500	Bell
10,800	Boeing
6,500	Douglas
5,000	Grumman
10,000	Lockheed
13,500	North American
8,000	Thompson Products
9,000	United
3,200	United, preferred

Airlines

10,000	Air Express Int. Agency
1,000	Air Express Int. Agency, Warrants
13,200	American, preferred
8,000	Braniff
5,000	Chicago & South.
2,500	Chicago & South. V.T.C.
10,000	Delta
40,000	Eastern
9,500	National
18,600	Northwest, preferred
$350,000	PCA Debentures
5,000	United
5,100	United, preferred

▶ **New Acquisitions**—Among the aircrafts, all of the North American and United represent new acquisitions during the year. Substantial increases were made in the holdings of Bell, Boeing, Douglas, Grumman and Lockheed aircraft companies.

In the airline group the entire holdings of Air Express International, Northwest and United preferred were acquired during last year. Partly to offset these purchases, Northwest and United common stocks were sold. Important additions also were made in American preferred, Braniff, Delta and National Airlines stock.

In the aircraft investments, Bell, Boeing, Grumman, Thompson Products and United Aircraft currently are selling in excess of cost. For the most part, purchases in these shares made earlier in 1947 are responsible for this showing. In the airline group, only Eastern and Braniff Airlines show a net profit.

▶ **Aircraft Holdings Reduced**—Air Investors, Inc., which formerly devoted its investments exclusively to aviation shares, continued its trend toward further diversification in the broad industrial lists. As of the 1947 year end, total aviation shares represented less than 20 percent of all securities owned. During last year, holdings in United Air Lines and Northrop were completely liquidated. Material reductions were made in the remaining investments of American Airlines, American Overseas Airlines, Eastern Air Lines, Northwest Airlines preferred, Pan American Airways and TWA.

At the end of 1947, the more important holdings of Air Investors consisted of 5500 Eastern Air Lines, 5800 American Airlines and 1200 Northwest preferred.

It appears that as a result of this industrial diversification Air Investors showed but a nominal loss in total assets due to market declines during last year. Net assets as of the 1947 year end amounted to $1,278,470 showing a decline of about 7 percent from the previous year. (National Aviation declined about 12 percent in asset values during last year.)

▶ **Continues to Specialize**—Another trust continuing to specialize in aviation securities is Aviation Group Shares of Institutional Shares, Ltd. This portfolio consisted of holdings in 18 issues having a total cost of $863,472 with a market value of only $584,987. Only investments in Boeing, Eastern and Grumman show a profit over average costs. Among the more important holdings as of the 1947 year end were: 4600 Eastern, 8400 American, 2700 United Aircraft, 1200 Douglas, 2600 Boeing and 3600 Lockheed.

The Lehman Corp., general investment trust, did not disturb its aviation investments during the second half of 1947. Its total holdings in this group represent a total cost of $1,635,642 with an indicated market value for these securities of only $1,171,094 as of the 1947 year end.

Lehman Corp. continues to hold 36,000 American, 18,750 American Overseas, 10,000 Eastern, 6500 Pan American Airways, 5000 Sperry and 29,000 United Air Lines.

▶ **Other Trusts**—Other trusts which showed important aviation investments included National Investors which as of Dec. 31, 1947, reported holdings of 50,000 shares of American, 24,500 shares of Eastern and 6,000 shares of United Air Lines.

Investors Management, as of the same date, showed holdings of 4000 Grumman and 3000 shares of United Aircraft.

Fundamental Investors owns 10,000 shares of Grumman and 16,000 shares of United Aircraft for its sole investments in the industry.

Capital Administration reported holding 10,000 American, 2100 Eastern and 500 United Air Lines.

A review of all trust holdings in the aviation group show Grumman and United Aircraft as the favorites in the aircraft manufacturing section with Eastern and American Airlines as the contenders for leadership in the transport category.

—Selig Altschul

London Letter:

Deficit and Equipment Problems Harass BOAC as 1948 Begins

Nineteen idle Tudors await BOAC decision; carrier ponders move to buy 40 DC-4Ms from Canadair for probable use on Empire routes.

LONDON—Sir Miles Thomas, 50, who only recently ended a long association with the Nuffield Organization (Morris, Wolesley, and Riley motor cars) as its vice-chairman and active managing director, has joined British Overseas Airways Corp. as its deputy-chairman.

With BOAC, Sir Miles will be free to indulge his long-felt interest in the overseas development of industry within the British Commonwealth. He will be specially responsible for advice on problems of organization and operation on BOAC's Empire routes.

Sir Miles' new appointment, which takes effect Apr. 1, will not interfere with his duties as a director of Britain's recently-established Colonial Development Corporation nor as industrial-development consultant to the government of Southern Rhodesia.

* * *

Sir Miles joins BOAC at a time when, to paraphrase Gilbert & Sullivan, "a director's life is not a happy one." The corporation's recently released first financial report, covering the year ended last Mar. 31, showed a deficit of £8,076,844 ($32 million). Sir Harold Hartley, who inherited this situation when he became BOAC's chairman July 1, and Whitney Straight, who became managing director at the same time, found ready enough explanations for this deficit. Among those they cited:

- Too many types of aircraft, expensive to maintain.
- Delay in delivery of the Tudors (19 of which are now standing on the A. V. Roe airfield near Manchester, still unapproved by BOAC) and the changes in plans which had therefore to be made, with financial repercussions.
- Maintenance at scattered and improvised bases.
- Deficiencies in route-organization.
- Necessary development work carried out by BOAC.
- Services required in the national interest which overruled normal commercial considerations.

Sir Harold concluded that as long as the present types of aircraft continued to be operated, even with a high load factor, revenues would barely cover direct operating costs, with no contribution to overhead. "Increased services," he commented, "would consequently mean merely an increased deficit."

* * *

One move toward more suitable aircraft is still under consideration. This would enable the corporation to take full advantage of the high-payload-factor in the DC-4M design with less dollar-expenditure than would be required for the purchase of American-built Skymasters or Connies. The move calls for BOAC to acquire from Canadair as many as 40 DC-4Ms powered by Rolls-Royce Merlins. The cost of these, around £162,000 ($648,000) each, is only a little more than half that of a Constellation, and one-sixth of this figure represents the cost of the engines, which (being British-made) would not require precious dollars. Moreover, during the plane's life most of its service-cost would be for engine spares and replacements, so that nearly half of its total cost could be met from sterling, and its dollar cost could easily be met from its dollar-earnings.

Canadair, according to reports received here, could swing into high-gear if it received such an order in the near future, and could begin deliveries of the 40-passenger improved version by July. Crews could be trained in the meantime by arrangement with Trans-Canada Air Lines, which has already proved the serviceability of this design on its own trans-Atlantic operations.

BOAC, with its five Connies and expecting soon to receive the first of the six Stratocruisers which are on order, wouldn't need the DC-4M for its North Atlantic run, but would probably use it on the Empire routes, instead.

But at the moment, BOAC hasn't decided whether it is worth making the effort—and it would require a big effort—to carry such a proposal all the way through the several government departments, including the stubbornest of all, the Treasury.

* * *

After some delay on its report on the Tudor *cause celebre*, due to inter-departmental differences, the Courtney Committee recommended that an airworthiness certificate be reissued and service between London and Montreal be started with Tudor Is, the resulting deficit to be made good to the operators. The Ministry of Supply, carrying the ball for all-British aircraft on British airlines, upholds the view that Tudor Is should go into immediate service on the North Atlantic route (for which they were ordered initially as an "interim" type"), despite the clear expectation that the 12-seater aircraft would lose BOAC at least £1,400,000 a year in daily service between New York and London. (It was on this ground that BOAC rejected the Tudors several months ago.) The Ministry of Civil Aviation, on the other hand, confronted with BOAC's deficit (above) and British European Airways' £2,500,000 deficit, is hesitant to enforce a decision that would commit British airlines to even greater deficits.

Meanwhile, BOAC runs on—losing what the Fleet Street statisticians compute is £63 per passenger—with its hands still tied on the choice of aircraft for present operations, and several still-to-be-proven future types (the giant Brabazon, the DH Comet, and the Saunders-Roe S. B. 45 flying boat) committed to it for future use.

This, then, is the plight into which the confident automobile manufacturer steps.

—Frederick R. Brewster

BOAC-BSAA Merger?

LONDON—Despite the strong conflict in personalities that would result, a merger of BOAC with BSAA (British South American Airways) is regarded as possible in the near future. More likely it would be important as the first step toward cutting overhead rather than as a step toward amalgamation of all three British lines. Sir Miles Thomas is under official consideration for chairman of the merged corporations, whether two or three, to give them topnotch business management. Air Vice Marshall D. C. T. "Don" Bennett from BSAA is being spoken of for chief executive officer.

1949 — Can Be a Good Year Too

You can expect good business to run on well through 1948.

But old-time competition is close upon us.

And 1949 will be a critical year for all of us — making lower taxation imperative NOW.

These are the main conclusions drawn from a nation-wide survey of industry's plans for new plants and equipment which McGraw-Hill has just completed. Here are the major findings:

1. Capital expenditures in 1948 may be a little lower — but at the most only 8% lower — than in 1947.
2. In 1949 capital expenditures may decline. 1949 plans are still fluid. However, those which have been projected now show a falling off. (Washington planners, please note: Current official attempts to discourage capital expansion may turn out to be superfluous — or downright dangerous.)
3. Industry's initial postwar rebuilding will be 85% complete at the end of 1948. When this first wave of deferred maintenance and expansion is finished, American industry will have more than half again the capacity it had in 1939. This does not mean the end of needed capital expenditures. Business will need to invest much more. (President Truman sets an investment goal immediately ahead of $50 billion.) But it does mean that tough competition is returning fast.

• IF YOU WANT *full details of the McGraw-Hill survey of Capital Expenditures, which is summarized in this editorial, write to the Economics Department, McGraw-Hill Publishing Company, 330 West 42nd Street, New York 18, N.Y.*

These are solid facts, based on plans which are firmly made by a broad cross-section of American industry and which the McGraw-Hill survey revealed.

The greatest contribution of this survey is the information it supplies on business plans for the purchase of new plants and equipment. What business planned to do about such expenditures was by far the biggest unknown element in the 1948 outlook. For, if business planned to slash its outlays for plants and equipment this year, that fact alone could bring a sharp downturn in business.

In making this survey, McGraw-Hill researchers all over the nation personally interviewed top executives of companies selected to make up a scientific cross-section of industry. Each executive was asked to give, *not his opinion* about general business trends, but *factual details* about his company's plans for 1948. By adding together the plans of the companies interviewed, McGraw-Hill has secured, for the first time, a reliable picture of what business plans to do in the months ahead.

Here are plans for 1948 and 1949, as revealed by the survey:

1. Industry still needs more than a year to finish its initial postwar maintenance and rehabilitation program.

Among manufacturing industries, top executives report that 64% of their program for the immediate postwar period is now complete. According to present plans, 85% will be installed by the end of this year even though some manufacturing industries still have a long way to go. For instance, oil companies will complete only three-quarters of their presently planned expansion program by the end of 1948.

2. Business may spend less on new plants and equipment this year than the record $16.1 billion spent last year. But the decline

probably will be negligible and certainly will not be great enough to bring on a business recession.

At the time McGraw-Hill interviewed top executives, some companies had not yet approved their 1948 capital budgets. Under the extreme assumption that those particular companies will make *no* capital expenditures in 1948, industry's 1948 bill for new plants and equipment will run to $14.9 billion, or 8% below last year's record figure. Under the more realistic assumption that those companies will cut their capital investment only as much as the companies which had already drawn up their plans for 1948, industry's 1948 capital budget will run to almost $15.8 billion, a decline of only $300 million from 1947.

Thus the over-all conclusion of the McGraw-Hill survey is that capital expenditures by business will be only slightly lower this year than last.

3. Business executives will not slash their 1948 capital budgets unless they are convinced that a real slump is in the offing—and they are not convinced now.

Almost two-thirds of all manufacturing companies say they would not cut capital budgets sharply even if business activity declined 20%. What is more, even a 15-20% boost in wage rates would have little effect on projected capital budgets. If wages go up, 57% of manufacturing companies would not change their capital budgets, 26% would increase them, and 17% would cut them.

4. Most executives look for an increase in their company's sales this year.

More than half of all manufacturing companies are planning on a sales increase over last year of 10% or more. A third of them say sales will be about the same as in 1947. And fewer than 10% look for lower sales.

5. Manufacturing companies will finance much of their purchases of new plants and equipment in 1948 from funds set aside out of past or current earnings.

Utilities and railroads, on the other hand, must go to the securities markets or commercial banks to finance most capital expenditures.

Although manufacturing companies say they can finance this year's capital expenditures in large part from current profits and past savings, all evidence indicates that, to do so, they will use up most of the funds they earmarked during the war for this purpose. So in 1949, industry must go to the capital markets or to the commercial banks if it is to continue to spend for capital purposes. If the securities markets continue to lie in the doldrums, *as they will under present tax laws,* only companies with triple A credit ratings will be able to raise funds that way.

6. Purchases of new plants and equipment may fall off in 1949.

The McGraw-Hill survey collected all available evidence on plans for 1949 capital budgets. Fewer than 40% of all manufacturing companies now have definite plans for 1949. Of those that have plans, 45% intend to spend less than in 1948, 30% plan to spend the same amount, and a quarter expect to spend more. These preliminary decisions would seem to indicate that capital investment may fall off in 1949.

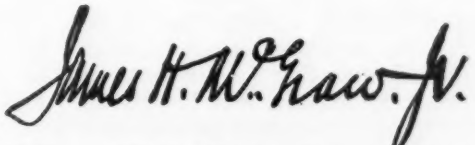
7. Industry's production capacity in 1949 will be far above prewar.

Manufacturing capacity will be more than 50% greater than in 1939 once the present wave of postwar building is complete. Almost a third of all manufacturing companies report that their capacity will be double or more than double the prewar figure. Thus, 1949 may see a huge increase in production of many things that now are hard to buy.

The last two points in this summary mean that 1949 will be a critical year. We must forestall a sudden drying up of capital expenditures in that year. We must be able also to absorb a great outpouring of production both of capital and consumer goods.

What will happen to business in 1949, therefore, will depend on how successful we are this year in dealing with such momentous problems as taxation, foreign aid and prices. But 1949 *can* be a good year too.

The next editorial in this series will discuss the pivotal problem of taxes.



President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 65TH OF A SERIES

Modified DC-6 Being Tested; Airlines Eye Service Resumption

Cost of changes to 145-plane fleet, including craft not yet delivered, estimated three to four million dollars; Douglas to bear major expense.

By SCHOLER BANGS

With the first modified plane now flying in California, three major airlines have set up target dates for partial restoration of DC-6 service.

American Airlines, United Air Lines and Pan American Airways plan to have a considerable number of DC-6s back in operation by Apr. 15. As a result of exhaustive tests in progress during the past ten days, Douglas Aircraft Co. expects CAA approval of the first modified DC-6 this week.

▶ **Cost Estimated**—Improvements and changes incorporated in the test DC-6 at Douglas' Santa Monica plant are being made on some 90 other DC-6s previously delivered to the airlines. Cost of modifying the total fleet of 145 DC-6s—including those not delivered to the carriers before the grounding last November—is estimated between three and four million dollars, the major portion of which will be borne by Douglas.

American Airlines is aiming at the first week in March for restoration to service of several planes, which probably will be in the "B" category of the DC-6 modification program—certificated for use with cabin heat but no pressurization.

▶ **Other Target Dates**—United Air Lines will try to have three DC-6s ready for California-Hawaii service by Apr. 15, either as "C" modified transports—certificated for both heat and pressure—or "B" class planes.

Pan American has Apr. 6-7 as its delivery target for two "C" category planes, to be followed at an undetermined date by three more. All five will be assigned to Panagra for South American runs.

▶ **Re-Estimation Made**—The target dates now given represent a re-estimate of modification time requirements and were set up recently, after Douglas informed the carriers that previous time tables would be delayed four weeks.

In the case of American, 50 planes are involved in DC-6 modification. Thirty are being modified by American's shops at Tulsa and 20 by Douglas in Santa Monica. United is modifying 20 at San Francisco, with another 20 under modification by Douglas.

▶ **Speculation Seen**—None of the major airlines has indicated intention to resume DC-6 service with "A" category modification—certificated for use without cabin heat or pressurization.

In view of certification tests still in progress on some factory modification components, none of the airlines last week was able to declare more than a speculative hope that they "might" achieve flight resumption target dates.

▶ **Bearing Problem**—Still uncertified was a small but critical new part, a newly-designed impeller shaft oil seal bearing on the cabin pressure supercharger. The old-design bearing had been responsible for numerous failures in which oil leaked and was drawn into the cabin heater system to become a fire hazard.

In at least one instance, smoke from oil drawn into cabin heater lines filled the cabin of a DC-6 and gave passengers the false impression that the plane was on fire. Tests of the new bearing were reported progressing satisfactorily, and certification was expected momentarily.

▶ **Higher Cost Possible**—Unforeseen problems in component production costs and manhour charges for modification may drive upward Douglas' original estimate that the changes will cost the factory between three and four million dollars. However, there has been no confirmation of rumors that the cost to the factory might run to six million.

Actually, final costs had not been evaluated by the first week in February. At that time Douglas was preparing, for negotiation with the airlines, new modification cost estimates that will consider rebates to carriers for modification labor assumed in airline shops.

(Cost of the DC-6 grounding to the airlines—because of services lost—is being estimated at between $10,000,000 and $12,000,000.)

▶ **Loss Carryback Problem**—Two new headaches recently have appeared in the DC-6 modification picture, and the solution of neither is immediately apparent. One revolves around whether Douglas will be able to modify its direct loss

PUSH-BUTTON COMMUNICATIONS CENTER

High-speed communications between all major points on United Air Lines' transcontinental system now are possible through opening of a new communications switching center at Chicago. Shown above is one bank of switching machines. By pushing a button, employes can transmit messages either singly or in combination to any of 74 cities on the UAL system. A master message distribution panel permits simultaneous sending of a single message to several different circuits or addresses. This is accomplished by setting up the desired pattern of distribution at the master push-button switching panel and then depressing a "start" button. Thereafter, as soon as the various circuits selected are free, the message is transmitted simultaneously to the several addresses. United's 15,000-mile wire network handles an average of 2,500,000 messages monthly.

through application to last year's modification loss tax carryback statement of the unforeseen additional charges that have developed since Jan. 1.

The other grows out of a threat by Los Angeles County's tax collector to assess for personal property tax collection purposes all airline DC-6s now at Santa Monica, even though the airplanes for tax purposes nominally are based at other cities or in other states. The airlines feel the threat to be unjust, and Douglas said it would aid them in conferences with the tax office. A decision must be reached before Mar. 1, the date when all aircraft within the county are listed for personal property assessment.

BOAC Pushing Deal For Canadair DC-4M2

Possible order for 40 pressurized DC-4M2 aircraft from Canadair Ltd., Montreal, hinges on debate in House of Commons, London, England, where British Overseas Airways Corporation has pointed out that operation of converted Halifax bombers and A. V. Roe Company's Tudor aircraft is too costly and not satisfactory. The Air Ministry and BOAC do not agree on merits of the British-built aircraft.

BOAC points out in its argument that the Tudor is uneconomical for trans-ocean business. It wants the DC-6, which the British government is not willing to purchase. BOAC states further that it considers the Canadair DC-4M2 as good as the DC-6. The DC-4M2 can be purchased with Canadian dollars at about $625,000 each. Prestige of British commercial aircraft is believed partly the basis of the parliamentary debate.

No actual orders have been placed as yet by BOAC with Canadair for the DC-4M2. The Montreal company, a wartime government corporation purchased by Electric Boat Company, Bridgeport, Conn., is licensed to build the Douglas DC-4 for export anywhere. Canadair has orders on hand for a total of 20 of the aircraft for Trans-Canada Airlines, about half of which have been delivered, and for about the same number for the Royal Canadian Air Force. It employs about 8000 workers.

Canadair hopes to get orders from BOAC so as to keep its plant in operation. The DC-4M2 is a product of United States, Canadian and British engineering skill, since the original DC-4 has been modified at Canadair to incorporate some DC-6 features and is equipped with Rolls-Royce Merlin engines. It is the only large transport built outside Europe with any sterling currency content, and this factor will weigh heavily in any decision to be made by the British government and BOAC.

Overseas Lines Set For Air Parcel Post

With rate schedules to some countries already approved, the Post Office Department expects to inaugurate overseas air parcel post service early next month.

First service probably will be to European points. Three U. S. flag carriers, American Overseas Airlines, Pan American Airways and TWA, will handle initial shipments.

▶ **Cables Sent**—The Post Office Department recently cabled the postal administrations of 32 countries asking their approval for immediate inauguration of air parcel post service from the United States. Indorsement of the service already has come from Austria, Belgian Congo, Bermuda, Czechoslovakia, Denmark, Egypt, England, Finland, Gold Coast, Ireland, Netherlands, Newfoundland, Norway, Switzerland, Tunisia and Turkey.

Two countries, France and Palestine, replied that they are not now prepared for air parcel post from the U. S. Nations offered the service but which had not replied to the Post Office Department's cable by early last week were: Belgium, Germany, Syria, Pakistan, India, Portugal and the Azores, Union of South Africa, Senegal, Iceland, Sweden, Spain, Italy, Greece and Algeria.

▶ **Service Ready**—Second Assistant Postmaster General Paul Aiken said that "just as soon as word is received from any nation that it will accept air parcel post, we are ready to institute service." Air parcel post, he declared, will be accepted for mailing at any post office in the U. S. and in addition to air transportation overseas will receive all available domestic air mail service.

While the rates are on a complicated scale for each country, postage on a five-pound package sent to Great Britain from any point in the U. S. will be $8.79. A five-pound package sent to Switzerland will cost $9.50. The charges are based on a cost of 75 cents a ton mile domestically and overseas.

Airlines Study Passenger Habits

Nearly 33,000 travelers polled in move to improve service in New York area.

Improved service for travelers using LaGuardia Field and Newark Airport is anticipated by the airlines and the Port of New York Authority as the result of a recently-completed eight-day survey covering nearly 33,000 passengers.

The study, which may be followed by similar surveys in other important U. S. air centers, spotlights the passengers' reasons for traveling, their income bracket, occupation and age group. Special emphasis was given to the airline customer's habits before boarding and after leaving his plane.

▶ **Income Groups**—Answers to the income questionnaire showed more than 39 percent of the airline users make less than $6,000 annually; more than 38 percent have salaries between $6,000 and $15,000; and over 22 percent earn in excess of $15.000.

Passengers between 26 and 45 years of age constituted nearly 57 percent of these queried. while persons over 45 made up nearly 27 percent. Travelers under 26 represented over 16 percent.

▶ **Occupations Listed**—Professional people form the largest single group of airline customers. Other large blocks of air travelers come from manufacturers, retail businessmen, utilities officials, government personnel, insurance representatives and wholesalers.

The proportion of women passengers on scheduled airlines is increasing, the study indicated. Several months ago, a poll of airline travelers showed 25 percent were women, but the New York survey showed 28 percent.

▶ **Fewer Emergency Trips**—More than 52 percent of the passengers were traveling on business, 26 percent for pleasure, and nearly 14 percent were combining the two. Flights because of emergency —a reason which in the early days of air travel ranked highest—were noted in less than 8 percent of the questionnaires.

When given a list of possible improvements in service, the largest number of passengers (6,083) mentioned the need for an airport hotel; more than 5,000 asked for an open parking lot at the airport; an equal number for garage parking; and nearly 3,000 indicated a desire for automobile rental facilities.

▶ **Baggage Study**—About four-fifths of the passengers checked their baggage. Only one in eight had excess baggage, and more than 5,000 traveled without enough baggage to be checked.

During the eight-day survey period, LaGuardia and Newark airports were handling a peak load of 2,603 passengers in the hour between 4 and 5 p.m. Heaviest outbound flow was 1,624 passengers between 8 and 9 a.m., while the largest inbound flow was 1,524 travelers between 4 and 5 p.m. Lowest inbound period was between 1 and 3 a.m. and outbound between 3 and 6 a.m.

Airport limousines transported more than 14,000 of the 33,000 passengers from the fields, private automobiles over 9,000, taxicabs 6,680 and buses 1,253. Thirteen percent of the passengers reported they were taking their first flight.

C. R. Smith Testifies In Cargo Rate Probe

AA executive doubts present freight tariffs are profitable for any carriers.

A thorough investigation of airfreight rates offered by both certificated and uncertificated carriers got off to a fast start this month as C. R. Smith, chairman of American Airlines' board of directors, scored the "duplicating" services set up by independent cargo lines.

Testifying at a CAB hearing, Smith said the uncertificated airfreighters wish to divide air transportation into segments, serving only metropolitan cities and entirely disregarding the small communities. He stated that without the more remunerative operations to larger cities, the certificated carriers will be unable to take care of the needs of smaller points.

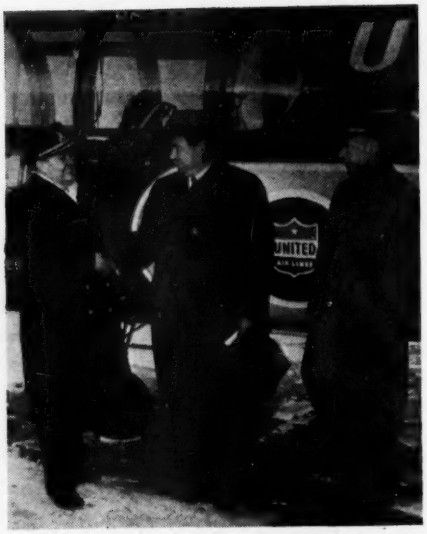
▶ **Denies Charges**—Smith denied allegations that American has used mail subsidies to maintain low-cost airfreight service. He emphasized that CAB itself has stated that American's 45 cents a ton mail rate is a service rate, adding that the Post Office makes a profit on the transportation performed.

The AA executive predicted that if his company is not permitted to carry freight the cost of mail and passenger service will increase, and higher fares and mail rates will be necessary in the future. Smith said the year-old operations of American's Contract Air Cargo Division were consolidated with its regularly-scheduled cargo service last spring because CACD was "highly unprofitable." Uncertificated carriers had accused CACD of starting a rate war with tariffs of 11 cents a ton mile.

▶ **Present Rate Low**—"I am not sure," Smith declared, "that present freight rates are profitable either to the noncertificated carriers or to the certificated carriers." He cited recent increases in gasoline costs alone which will add several million dollars annually to American's overall operating costs.

Under persistent questioning from Slick Airways attorneys, Smith declared that his company did not keep a separate set of books for freight, mail and passenger operations. He said it is impossible to allocate to each service the exact cost of providing it. The AA board chairman stated it now costs his company a little more than 45 cents a ton mile to carry mail, but he refused to state whether American plans to ask CAB for a higher rate.

Smith disclosed that American hopes to double its all-cargo fleet in the next three months. The carrier plans to place five or six more DC-4s in cargo operation along with three of four more DC-3s for service to smaller points. Less than half of the 60 cities on American's system are now served by the carrier's all-cargo flights.



'COPTER OFFERED

U. S. Coast Guard headquarters in Chicago has accepted United Air Lines' offer to furnish the company's S-51 helicopter and crew for use at any time in air searches or other emergencies on Lake Michigan. Capt. Nathaniel Fulford, USCG, representing the commandant of the Ninth Coast Guard District, is shown thanking J. A. Herlihy, UAL's vice president-operations. United has been using the S-51 in engineering and operational studies in connection with its application for helicopter mail service in the metropolitan Chicago area.

39 Irregular Lines Face CAB Penalty

Thirty-nine uncertificated irregular (nonscheduled) airlines faced suspension of their letters of registration last week for failure to file quarterly operational reports with the Civil Aeronautics Board.

The board said none of the 39 carriers listed had filed operational reports which were due on Jan. 20 and which were to cover the period of the three preceding calendar months. Data in the reports were to include a listing of all flights, date of departures and arrivals, the origin, destination and intermediate points served.

▶ **All Use Large Planes**—All 39 nonscheduled operators were listed as using transport aircraft of approximately Lockheed Electra size or larger. CAB said their failure to comply with the report requirement seriously impairs the Board's ability to carry out its duties.

Carriers cited: American Flyers, Fort Worth, Tex.; Amphibian Air Transport, Long Beach, Calif.; Argonaut Airways, Miami; Arizona Airways, Phoenix; Aviation Corp. of Seattle, Seattle; Barnes Aircraft, Lumberton, N. C.; Ben Bransom Charter Service, Dallas; M. D. Bryant, San Angelo, Tex.; Central Air Transport, Miami Beach, Fla.

▶ **Alaskan Companies Included**—Coastal Air Co., Hialeah, Fla.; Commercial Air Cargo, Hartford, Mich.; Decatur Aviation Co., Decatur, Ill.; Consolidated Air Transit, Teterboro, N. J.; Golden North Airways, Fairbanks, Alaska; Great Lakes Airlines, New York; Gulf & Western Airlines, Houston; Hardy Aviation, Waynesboro, Pa.; Hemisphere Air Transport, New York; Magnolia Airlines, New Orleans; Mercury Airlines, Fort Worth; Great Continent Air Service, Milwaukee; Modern Air Transport, Hempstead, Long Island, N. Y.; Nationwide Air Transport Service, Miami Springs, Fla.

Northern Airlines, Seattle; Ocean Air Tradeways, Ronkonkoma, Long Island, N. Y.; Pearson-Alaska, Inc., Anchorage; Inter-American Airways, Miami Springs; Seattle Air Charter, Seattle; Skytrain Airways, New Orleans; Skyways International Trading & Transport Co., Miami; Sourdough Air Transport, Fairbanks, Alaska; Southern Air Transport, Miami; Totem Air Service, Seattle.

Trans-Alaskan Airlines, Anchorage; Trans-Atlantic Airways, New York; Trans-Luxury Airlines, New York; Transair, Inc., New York; Winged Cargo, Inc., Philadelphia; and Latin-American Cargo, Inc., Philadelphia.

British Investigate Loss of Tudor IV

The British government has launched an investigation into the accident involving a British South American Airways Tudor IV which was lost at sea.

The Ministry of Civil Aviation also announced that the four-engine craft were being withdrawn from service temporarily. Members of the British House of Commons questioned whether BSAA had placed its Tudor IVs in scheduled passenger service with sufficient preliminary proving flights.

▶ **Airline View**—BSAA, which has been operating 32-passenger Tudor IVs on its Bermuda route since last October, said it saw no reason why permission should not be given to resume operations with the aircraft. Prime Minister Attlee announced that two Tudors had been ordered for use on special missions by cabinet ministers.

The British government last month decided the future of the slightly-different 24-passenger Tudor I transport, which was under considerable criticism from airline officials (AVIATION WEEK, Feb. 2). If final tests are successful, the Tudor I will be put in service on British Overseas Airways' routes.

SHORTLINES

▶ **Alaska Airlines**—New contract operations include transportation of displaced persons from London, England, to Johannesburg, South Africa, with two DC-4s and flying dependents of Army personnel from Seattle to Alaska. . . . Carrier plans to move its Seattle area base from Boeing Field to Paine Field on Mar. 1.

▶ **American**—Has completed arrangements for standing credit of $7,500,000 with three banks in Pittsburgh, New York and Los Angeles. No part of the credit is being used currently, but it will provide potential resources against unforeseeable contingencies.

▶ **California Eastern Airways**—Reportedly plans additional financing. Stockholders last week were to vote on a proposal to increase authorized capitalization from two to three million shares and to change the par value from $1 to 10 cents a share.

▶ **Capital (PCA)**—Hopes to inaugurate its new Birmingham, Ala.-New Orleans link by Mar. 15.

▶ **Eastern**—Plans to open service to Bowling Green, Ky., on AM 10 about Mar. 1.

▶ **Empire**—Reports it will place DC-3s equipped with Hughes terrain clearance indicators in service on its Washington-Idaho-Oregon feeder routes this month.

▶ **KLM**—Increased passenger and freight traffic on its West Indies division 50 percent in 1947 compared with 1946.

▶ **Northeast**—Has received CAB authorization to suspend service at Montpelier-Barre, Vt., until May 15.

▶ **Northwest**—This month began flying dependents of Army personnel to the Orient, carrying 15 of the dependents on each of its thrice-weekly trips. The Army will pay regular fares. . . . Nearly 250 radio operators, members of the American Communications Association (CIO), have balloted by mail on a strike. The union is asking $285 monthly for ground men and $600 for flight personnel against present rates of $255 and $450 respectively. . . . CAB has denied petitions of Eastern, PCA and United for reconsideration of its Sept. 30, 1947, decision granting NWA a Detroit-Washington route.

▶ **Trans-Texas**—Plans to extend its feeder service to Laredo, Mission-McAllen-Edinburg, Harlingen and Brownsville, Tex., around Mar. 1.

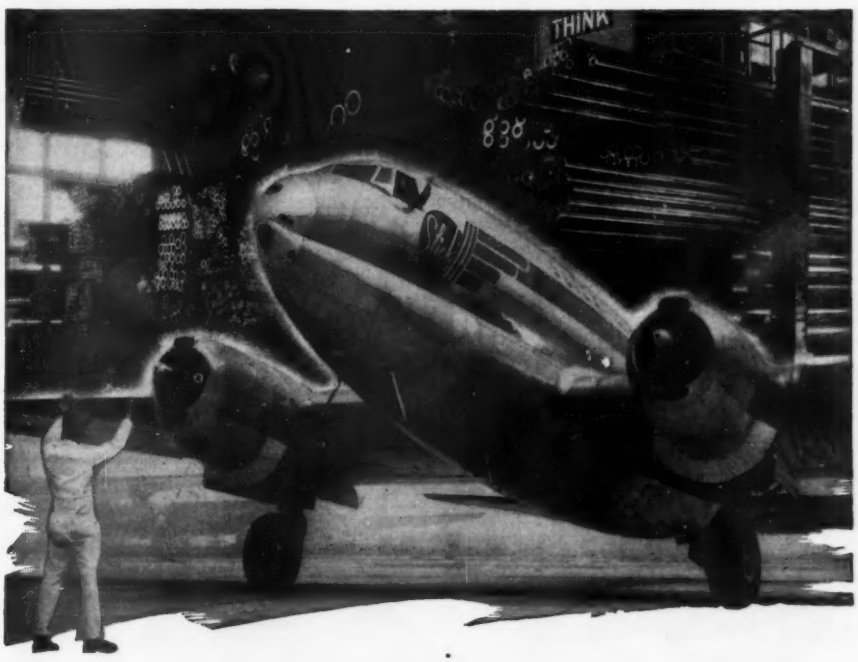
▶ **TWA**—Has asked the U. S. Court of Appeals to review CAB's order of last December rejecting the carrier's claim for $11,157,000 in retroactive mail pay. . . . A company Constellation carrying 33 passengers has made a record nonstop flight from Los Angeles to New York in 6 hr. 39 min., averaging 379 mph.

Inadequate Fuel Reserve Cause of Slick Accident

The pilot's failure to compute his fuel consumption properly and to provide for a safe gas reserve probably caused the crash of a Slick Airways C-46 cargoplane at Lockheed Air Terminal, Burbank, Calif., last Sept. 17, according to a CAB accident report.

Bound from Denver to Burbank, the plane received major damage when it landed with dry tanks after both engines had quit due to fuel exhaustion. The flight had encountered headwinds of unexpected velocity.

CAB said that had the pilot computed his fuel consumption based on time of flight and Slick's fuel consumption data, he would have landed at Las Vegas, Nev., in accordance with directions received from the company. The pilot stated his fuel quantity gauges did not indicate insufficient gasoline, adding that he suspected a fuel leak when his left engine stopped. Nobody was injured in the accident, but the plane received major damage.



Taking the Distance Out of Your Steel Problems

Urgently needed by a Los Angeles engineering company, was a large shipment of stainless steel pipe in a special size. A call to the Ryerson plant in Los Angeles disclosed that the required pipe was not in Los Angeles stock, but *was* on hand in another city.

Ryerson Los Angeles immediately phoned Ryerson in Chicago. Could Chicago supply the desperately needed pipe? Chicago could—and did! The material was quickly trucked to a Chicago airport, flown to Los Angeles, and delivered at the customer's plant the following morning, less than 24 hours after the order was received.

That's how Ryerson—when the steel *is* available—can take the *distance* out of your steel problems. That's how the twelve closely cooperating plants of the Ryerson Steel-Service System often accomplish the seemingly impossible in an incredibly short time. And that's the sort of far-reaching service you can look for when you contact any Ryerson plant for any steel requirement.

Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

PRINCIPAL PRODUCTS

Bars—hot and cold rolled alloy steel reinforcing—Structurals—Plates—Inland 4-Way Floor Plate—Mechanical Tubing—Boiler Tubes and Fittings—Allegheny Stainless—sheets, plates, shapes, bars, tubing, etc.—Sheet and Strip Steel; Tool Steel—Wire, Chain—Bolts, Rivets — Babbitt — Metal Working Tools & Machinery, etc.

RYERSON STEEL

NWA Plans Rebates For Delayed Flights

Fare increase also provided in new tariffs which will go into effect Mar. 15.

Northwest Airlines has taken unprecedented steps to recompense passengers on delayed flights, but at the same time it has acted to nudge fares higher.

Starting Mar. 15, Northwest plans to give a five percent rebate on its ticket prices whenever a flight reaches its destination more than 30 minutes late. The practice—similar to one in effect on some crack, extra-fare railroad trains—will apply to all domestic flights and to all seasons of the year.

▶ **Plan Explained**—In the case of flights cancelled short of their destination, passengers will get a five percent rebate of the entire fare, as well as the customary refund on the unused transportation. When a plane is more than 30 minutes late, the stewardess will make out refund checks and turn them over to passengers as they disembark.

When a transcontinental flight is cancelled with only a short distance of the trip completed, a long-haul passenger may receive in refunds virtually the entire cost of his ticket. A passenger holding a roundtrip ticket would receive a five percent rebate on one-half of the roundtrip fare.

▶ **Hunter Statement**—Admitting that much of the public's criticism of delayed flights has been justified, NWA President Croil Hunter declared that flying planes "on time all the time" has become a major objective of his company. It has adopted a program which goes into the causes and correction of delays from the time a plane leaves its hangar until it lands at its destination.

Cost troubles and delays in meeting schedules have been on the ground, Hunter stated. It is reported that Northwest will offer some sort of bonus to the most efficient ground crews each month if CAB approves the rebate plan.

▶ **A Fare Boost Sought**—Meanwhile, Northwest has asked CAB for permission to boost its domestic passenger fares, eight percent effective Mar. 15. The present 10 percent discount on roundtrip tickets would be continued.

The proposed increase would be the third by the carrier in less than a year. All the domestic trunklines instituted 10 percent increases in April, 1947, and (with one exception) again early this winter.

Even with the eight percent increase, Northwest's roundtrip fares will be two percent lower than the combined one-way regular tariffs of its competitors, which do not have the 10 percent roundtrip discount. The company's roundtrip fares will also be 12 percent lower than competitive combined one-way premium fares on DC-6s and Constellations.

CAB SCHEDULE

Feb. 16—Hearing on Willis Air Service's U. S.-Puerto Rico exemption request. (Docket 3141.)

Feb. 18—Reargument in Middle Atlantic Area case on Eastern Air Lines' application for trunkline service to Pittsburgh. (Docket 674 et al.)

Feb. 19—Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. (Docket 1956.)

Feb. 21—Hearing on Mid-Continent's Minot, N. D.-Regina, Saskatchewan, route case. (Docket 628.)

Mar. 15—Hearing on additional service in Hawaiian Islands. (Docket 2390 et al.)

May 15—Hearing on Capital Airlines (PCA) mail rate case. (Docket 484.)

BSAA Buys Vikings

British South American Airways has purchased five 24-passenger Vickers Vikings for service in the Caribbean area. The planes will replace Lockheed Lodestars used by British West Indian Airways, which has been taken over by BSAA.

USair C-46 "CARGOLINER"—Re-engineered to COMMERCIAL Standards

Participate in our "GROUP LICENSING PLAN" and SAVE!

USair's "Group Plan" provides for the pooling of individual orders into groups for production economy. This Group Plan offers you an NC'd CARGOLINER at $23,595 fly-away Niagara Falls, completely modified and licensed under our specifications in C.A.A. Type Certificate No. 789. This is your opportunity to own the most highly efficient NC'd transport aircraft ever offered, at a cost of less than 8% of the original A.A.F. price.

Prompt Delivery on Early Orders!
Write or Phone for Complete Information

Investigate Today!

United Services for Air, Inc.

Holders of the First and Only C-46 Model A&D CAA Type Certificate #789
P. O. Box 409, Niagara Falls Municipal Airport
NIAGARA FALLS, NEW YORK
Phone: Niagara Falls 3721 Cable Address: USAIR

C-46 "CARGOLINER" has:

- 1500 miles range with reserve.
- 215 MPH cruising speed.
- 45,000 lbs. gross weight.
- Over 8 tons useful load.
- Less than 5c per ton per mile direct cost.
- 2540 cubic feet of cargo space.
- Four-engine capacity, twin-engine economy.
- Excellent single engine performance at full gross weight.

Panagra Names Campbell As General Manager

Pan American-Grace Airways has appointed Douglas Campbell as vice president and general manager.

An officer of Panagra since 1935, Campbell in 1939 was elected a vice president and for some years was in charge of the carrier's business in South America. As general manager, his headquarters will be at Panagra's executive offices in New York.

Other personnel developments:

• **Air Cargo, Inc.**—James C. Austin, general sales and traffic manager of Capital Airlines (PCA), has replaced C. E. Woolman, president of Delta Air Lines, on the Air Cargo, Inc., board of directors.

• **Northwest**—J. J. Fateux has been named director of Orient sales, and James B. Emery has become Tokyo district traffic manager.

• **Pan American**—Pascal Cowan has been appointed press relations manager for the Pacific-Alaska division. He was formerly with United Air Lines.

• **Piedmont**—R. D. Hager, formerly with Eastern Air Lines, has become a director and assistant to the president.

• **Slick** — Parkman Sayward, formerly southwest division manager, has been named general sales manager. Robert W. Butler has become manager of ground services and procedure, and Norman E. Montgomery has been appointed manager of rates and tariffs.

• **Trans-Canada**—Gordon R. McGregor, who became president of TCA this month, has also been named to the carrier's board of directors.

MOLDED PLYWOOD

FOR AIRCRAFT

STRUCTURAL — DECORATIVE

SANDWICH STRUCTURES

METAL TO WOOD SPECIALTIES

GLASS CLOTH PLASTICS

GLASS MAT PLASTICS

KELLER PRODUCTS, INC.

MANCHESTER, N. H. TEL. 4951

FIXED BASE OPERATOR

AVIATION BUSINESS COUNSEL

★ Eliminate office problems.

★ Tie down those books and tax returns with accurate records and statistics.

★ Get monthly statement of profits.

★ We will do the work for you.

★ Write today for full details.

AVIATION BUSINESS COUNSEL

First National Bank Building

CHICAGO 3, ILLINOIS

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • PLANES • EQUIPMENT—USED or RESALE

New advertisements received Friday will appear in the issue mailed the following Friday subject to space available.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

WANTED — EXPERIENCED manager with good sales experience to take complete charge of operation. Have distributorships for planes and accessories on one of the outstanding private fields in the U. S. Write giving complete details as to experience, education and references. Enclose snapshot. A real opportunity for the right party. P-3840, Aviation Week.

FOR SALE

Twin Engine Beechcrafts:
C-18-S and D-18-S, good condition. Prices range from $20,000 to $45,000. Also converted AT-11 with hydromatics, reasonably priced. For details on any of the above, write: Warren Holladay, New York Aviation Corp., 5 West 46th Street, New York, N. Y.

Douglas DC-3, C-47,
seven to choose from. Start at $15,000 for unconverted C-47, 1325 airframe total. Passenger conversions at $40,00 each. Warren Holladay, New York Aviation Corp., 5 West 46th Street, New York, N. Y.

REPRESENTATIVE AVAILABLE

• **Representative for several Airlines, Manufacturers and over-haul bases, etc.**
Details and rates furnished upon request.
ROBERT F. EVANS CO.
c/o Douglas Aircraft Co.
3000 Ocean Park Blvd., Santa Monica, Calif.

FLIGHT TEST ENGINEERS

Several experienced flight test engineers required, who are capable of planning long range flight test on guided missile program. Reply should state experience, education, salary desired, and date of availability.

McDONNELL AIRCRAFT CORPORATION

P. O. Box 516 St. Louis 3, Missouri

FOR SALE

For Sale C-54A Aircraft
Zero time since major overhaul on airframe and engines, licensed CAA as cargo carrier, equipped with R-2000-7 engines, airflame approximately 3200 hours since new, full compliance fire preventative bulletins—Price $138,000.00. C-54A Aircraft—Zero time since major overhaul on airframe and engines, licensed CAA as scheduled 44-passenger airliner with new standard airline interior, equipped with R2000-7 engines, airframe approximately 3500 hours since new, full compliance fire preventative bulletins, auxiliary fuel tanks installed in inner wing—Price $195,000.00. Prices will be submitted upon request for conversion of the above air craft to modified B type, including installation of B wing panels. Send reply to: Texas Engineering & Manufacturing Company, Inc., P.O. Box 6191, Dallas, Texas, Telephone Madison-8141, or to Washington, D. C., office: Suite 308-9 Central Building, 805 G. Street, N.W., Washington, D. C., Telephone Metropolitan-3116.

FOR SALE

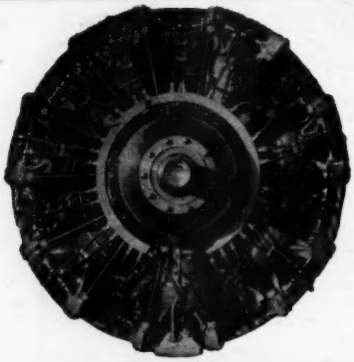
Grumman Goose, G-21 Amphibian,
dissassembled, need overhaul and major, no crackup. Quick sale, $20,000. Warren Holladay, New York Aviation Corp., 5 West 46th Street, New York, N. Y.

For Sale. Beechcraft D-17S
No time since top overhaul, 592 hours since major, reupholstered and refinished, has Bendix Radio with loop, can finish to customer's specifications. Priced to sell. E. J. Conklin, Aviation Corp., Sandston, Va.

WANTED

ANYTHING within reason that is wanted in the field served by Aviation Week can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

Additional Employment advertising on page 40



This fine engine, newly overhauled, warranteed, test-run, prepared for long-time storage and packaged for shipment, is available at $1795 f.o.b. Los Angeles, to operators all over the world. We are proud to present it— We would feel equally privileged to forward additional information and discuss with you any procurement you may now be planning.

ADDRESS INQUIRIES to Steward Davis
13501 S. Western, Gardena, Calif.
CABLE: STEDAV, Los Angeles Phone PLymouth 5-5144

this is the Steward-Davis R-1830-92 Conversion

AIRCRAFT ENGINEERS

Minimum four years experience on Stress Analysis, Aerodynamics, or Design.

McDONNELL AIRCRAFT CORPORATION

P. O. BOX 516 ST. LOUIS (3) MISSOURI

GUARANTEED BRAND NEW EQUIPMENT

In Original Manufacturers' Cartons

Pioneer Remote Indicating Magnesyn Compass Set, AN5730-2 Indicator and AN5730-3 Transmitter. 26 volts 400 cycle. **Price $15.00** per set.
Pioneer Inverter Type 12117. Input 24 volts D.C., 1 amp. Output 26 volts 400 cycle. **Price $7.00** each net.
Pioneer Inverter Type 12117. Input 12 volts D.C., 2 amps. Output 26 volts 400 cycle. **Price $12.50** each net.
Kollsman Remote Indicating Compass Set Indicator Part No. 680K-03, Transmitter Part No. 679-01. 26 volts 400 cycle. **Price $10.50** per set.

Write for Our Complete Listing!

INSTRUMENT ASSOCIATES

40-37 172nd Street Flushing, L. I., N. Y.
Telephone Flushing 7-8718

DELUXE TWIN-BEECH

FOR SALE: — Fully-equipped corporation-owned deluxe Twin-Beechcraft built in 1946. With only 400 hours total and no time since complete 100 hour inspection by us, ship is in perfect condition. Has P & W 450 hp engines equipped with hydraulic propellers and anti-icers. Cabin has three seats and couch of green bark-weave upholstery, eighty gallon nose tank and de-icers. Complete Bendix airline radio equipment including 50 watt 10 channel transmitter, ADF, anti-static loop. $47,500.

Atlantic Aviation
TETERBORO AIRPORT
TETERBORO, N. J.
PHONE: HASBROUCK HEIGHTS 8-1740

NAVION

Just relicensed, used exclusively by executives, never cracked, AAA-1 condition, total hours 177, full gyro instrument panel, rotateable and fixed loop, dynamic damper on engine crank shaft, landing lights, flares, General Electric radio with two extra head phone jacks, Stewart Warner gasoline heater.

Must sell for business reasons. Solicit reasonable offer for immediate sale.

Phone or Write:

GREAT CENTRAL MUTUAL INSURANCE CO.
PEORIA, ILLINOIS

BOOKS

AIRPORTS

CAN PAY THEIR WAY

Charles A. Zweng's new book, AIRPORT OPERATION & MANAGEMENT, contains scores of workable ideas for increasing airport revenues. A practical, detailed guide for both the airport operator and the student of airport problems.
312 pp. Illus. $4.50

Other Recent ZWENG BOOKS

PARACHUTE TECHNICIAN: Construction, operation, inspection, maintenance $3.00
ZWENG AVIATION DICTIONARY: 16,000 aeronautical terms fully defined $6.00
FLIGHT ENGINEERS MANUAL: a thorough preparation for the new CAA engineer rating $4.00
NEW CIVIL AIR REGULATIONS: simple, convenient guide to the latest pilot rules. $1.00

Write for free catalogue.

PAN AMERICAN NAVIGATION SERVICE
12021 Ventura Blvd. AW-1, N Hollywood, Cal.

SCHOOLS

Rising Sun SCHOOL OF AERONAUTICS
ESTABLISHED 1930
"Built Upon the Success of its Graduates"
GOVT. C.A.A. and VETERANS APPROVED
ENROLL NOW FOR NEXT CLASS
Write for Illustrated Catalog.
2206-16 E. HUNTINGDON ST., PHILA., PA.

Your inquiry will have special value . . .

if you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

ADVERTISERS INDEX

AVIATION WEEK

FEB. 16, 1948

Aluminum Co. of America..... 25
Agency—Fuller & Smith & Ross, Inc.

Aviation Business Counsel 39

Bendix Aviation Corp. (Pacific Div.)
Second Cover
Agency—The Shaw Co.

Bendix Aviation Corp. (Eclipse-Pioneer Div.). 26
Agency—MacManus, John & Adams, Inc.

Consolidated Vultee Aircraft Corp..... 8
Agency—Young & Rubicam, Inc.

Curtiss Wright Corp. (Airplane Div.)
Front Cover
Agency—Charles Dallas Reach Co., Inc.

Darnell Corporation, Ltd..... 41
Agency—Henry L. Rhea Adv. Service

Foote Bros. Gear & Machine Corp..Fourth Cover
Agency—The Buchen Co.

Keller Products, Inc..... 39

Kidde & Co., Inc., Walter..... 3
Agency—Newell-Emmett Co.

Micro Switch Corp.....Third Cover
Agency—Hamilton Adv. Agency, Inc.

Pittsburgh Plate Glass Co. (Safety Glass).... 5
Agency—Batten, Barton, Durstine & Osborn, Inc.

Roebling's Sons Co., John A..... 4
Agency—Beatty & Oliver, Inc.

Ryerson & Son, Inc., Joseph T..... 37
Agency—Aubrey, Moore & Wallace, Inc.

Searchlight Section 39, 40

Socony-Vacuum Oil Co., Inc..... 19
Agency—Compton Advertising, Inc.

Texas Company, The..... 6
Agency—Buchanan & Co., Inc.

United Service for Air, Inc..... 38
Agency—Gaskill-Oertel Advertising

■

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT
Positions Vacant.....39, 40
Positions Wanted..... 39
Selling Opp. Wanted..... 39

EDUCATIONAL
Books 40
Schools 40

EQUIPMENT
(Used or Surplus New)
For Sale..... 40

DARNELL
Casters & Wheels

● Save Money, Floors, Equipment and Time by using DARNELL Casters and Wheels...

DARNELL CORP. LTD.
LONG BEACH 4, CALIFORNIA
60 WALKER ST., NEW YORK 13, N.Y.
36 N. CLINTON CHICAGO 6, ILL.

EDITORIAL

You CAN Be On Time
or
The Boss Is Aboard

There has been no more daring announcement by any airline recently than Northwest's proposal to rebate 5 percent of the fare when a passenger reaches his destination over a half hour late.

There are certain delays, such as stacking over a terminal in instrument conditions, which no airline can avoid unless it prefers not to operate at all. And we can foresee a host of perplexing problems that NWA is asking for.

The significance of President Croil Hunter's bold move, however, is that here is one industry top executive so determined to wipe out delays that he is willing to forfeit hard-earned cash when he cannot deliver.

It has been our contention for many months that airline executives have been so concerned with "bigger" problems that they have failed to understand or realize how the cash customer down the line gets kicked around.

From several years' observation, it appears to us that too few executive brains are permitted to leave headquarters offices and mix with the passengers. There is no one of executive rank, nor even a deputy executive, who is constantly on hand at the gates of every major airline terminal to guard the airline's reputation for passenger service. There is no one on the premises who dares to make exceptions or concessions to meet the peculiar and perhaps unprecedented set of conditions of the moment.

So passengers are herded like animals outside by a limousine, in a bitter winter blast, to claim baggage on a cart that should have been left under shelter. Or a thoughtless airline employe leaves a door open so a 20 mile an hour wind off the field can chill 30 or 40 passengers who stand 15 or 20 minutes waiting for a plane when they shouldn't have to be made to stand at all, as cheap as rough benches would be to install in those La Guardia sheds, for example. Tickets are collected slowly at the breezy door instead of on the plane. (The same collectors probably will go through the cabin doing a recount again anyhow.)

This theory of Croil Hunter's, that the top man himself can do the trick of improving service if he can properly inspire his passenger service employes, was proved the other morning on another airline. A personal reference is necessary. In the last six or eight months of frequent flying, we have been on only this flight that was noteworthy for its promptness in meeting a scheduled departure.

We were talking business with friends at Washington National Airport near the upper gate in the lobby. The lobby gateman was absent. Three minutes before the scheduled departure time, a uniformed airline attendant dashed up the stairs, and with a trace of exhaustion and terror in his voice asked, "Are you booked on Flight Sixty-Nine?" We were, but had not heard any final call. "You should be downstairs on that plane right now, sir," he cried. At the foot of the stairs the ticket man ripped out his coupon with unusual dispatch. Another employe stood holding the plane door, and closed it after us with a bang. The stair-ramp was hustled away as rapidly as they say a feeder airline always does it. The man with the fire extinguisher stood outside rigidly at attention. Begorra, the left propeller began turning slowly at the exact moment the reservations lady two days earlier had said it would. As we were quietly congratulating this line on its new railroad timing we glanced ahead and a great light dawned. In the left front seat idly glancing out the window at the whole operation was one C. R. Smith.

It made us wonder why the ground crews of every passenger flight can't act as though the Big Boss was aboard every ship. As a matter of fact it is—the American public.

Apparently airlines can do it when they want to. Croil Hunter seems to want to.

'Unnecessarily Worried'

Considering the rumpus from the Pentagon on the subject, this comment from the leading British aviation weekly, The Aeroplane, in its Jan. 23 issue, is worth reprinting here:

SUPERSONIC WITHOUT SWEEP

In their account of the recent report that the Bell XS-1 had exceeded the speed of sound, Time seems unnecessarily worried over the fact that the aircraft was revealed to the public as having a straight wing. . . .

Regular readers will remember that the first released details of the Miles M.52 supersonic project revealed that it had a straight wing. Time can rest assured that while most people, seemingly, have been preoccupied with swept-back wings for supersonic aircraft, other plan forms have not been ignored in this country or elsewhere, and their possibilities are by no means overlooked.

Let's Get This Straight

Several comments recently from critics of this editorial page have disclosed a rather surprising (to us) ignorance of the difference between an industry magazine and a newspaper, relative to circulation.

A letter from a technical school executive decides we are outspoken occasionally "to stimulate" circulation. On a plane the other day one of our editors sat beside a regional CAA official who was reading this magazine. The official conceded he liked everything about us but the editorial page: "Their editorials have to attack CAA every once in a while to increase circulation."

This is as good a time as any to say:

1—We call our shots as we see them. Those who feel abused are given space on our letters page.

2—We have no sacred cows; support no vested interests.

3—No editorial is written, no news story is written, in an effort to boost circulation. Since July our circulation total has been hundreds to several thousand higher than our guarantee to advertisers, and every additional subscription over that guarantee is, from a hard-boiled economic standpoint, a loss. For months not a single subscription solicitor was instructed to seek new readers for this magazine. A very few magazines can profit from subscriptions alone; Aviation Week is not one of them.

4—Therefore, in recent months we have not been able to accept by any means all of the new subscription orders mailed us. New orders accepted are carefully screened. We are not interested in fans, coupon-clippers, and comic-book enthusiasts. Our advertisers are not interested in addressing such groups, neither are we. Unlike a newspaper, which is always eager to jump circulation a few thousand, a responsible business magazine prefers a quality readership to quantity. We are no exception.

As far as this magazine is concerned, our aim is to inform and interpret, not to boom circulation. That goes for the editorials, too.

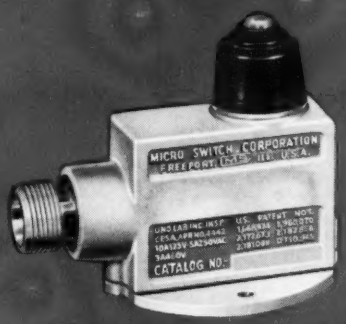
—ROBERT H. WOOD

MICRO *Precision Switches*

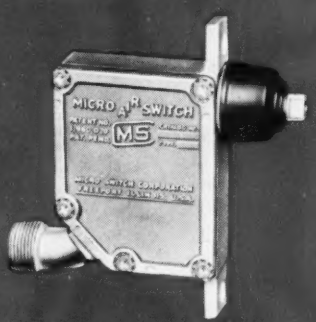
choose your switch requirements from the complete "MICRO" line

Varied shapes—sizes—actuators and capacities

MICRO LMR aircraft switch has sturdy die cast aluminum housing. Mounting holes make possible four position mounting on either face. Rotary lever arm actuator is adjustable through 360 degrees. Total travel of roller arm is 90° in either direction.



MICRO die cast enclosed switch is compact. It combines ruggedness with light weight and has high electrical capacity. It is used on military and commercial aircraft.



MICRO Type "H" housing switches provide a light weight, compact, high capacity electrical switch with long life expectancy. "H" housings are light weight, die-cast aluminum.

● The complete line of snap-action switches offers 3,900 varieties of shapes, sizes, weights, actuators and electrical characteristics so necessary to meet varied requirements. The "Know-How" gained by making this extensive line has resulted in outstanding dependability and long-life operation. The completeness of the line has made *the line* desirable to meet requirements of design engineers.

Exact repeatability of operating point is an outstanding feature which is a result of carefully controlled manufacturing methods. You can depend upon a MICRO precision switch to operate at the same point each time throughout the life of the switch. This perfection is the result of wide engineering experience.

Call on the "Know-How" of "MICRO" engineers.

The V3-1 MICRO Precision Switch is no larger than your thumb, but is dependable in performance

Suitable for use where limited space is available. It has a plastic case, is light weight and is durable. Terminals are heavy gauge brass with number 4 screws and lock washers.

D-C Ratings

28.5 volts, 6 amperes at 45,000 ft. altitude
28.5 volts, 10 amperes at sea level
Probable Contact Life . . 25,000 Operations

BRANCH OFFICES: CHICAGO 6, 308 W. Washington St.; NEW YORK 17, 101 Park Avenue; CLEVELAND 3, 4900 Euclid Avenue; LOS ANGELES 14, 1709 West 8th St.; BOSTON 16, 126 Newbury Street

SALES REPRESENTATIVES: PORTLAND, ORE., 917 S. W. Oak Street; ST. LOUIS 5, 6625 Delmar; DALLAS, TEXAS, Irwin-Keasler Bldg.; TORONTO, Ontario, Can., 11 King St.

© 1948 First Industrial Corp.

MICRO SWITCH
A DIVISION OF FIRST INDUSTRIAL CORPORATION
FREEPORT, ILLINOIS, U.S.A.

4 tons suspended in midair!

HERE is the Navy's new transport Helicopter—the Piasecki HRP-1. Suspended in midair, its giant rotors can support four tons of gross weight—can carry nine or ten men to safety in an emergency.

Both of the main rotor transmissions produced by Foote Bros. incorporate "A-Q" (aircraft quality) Gears.

These revolutionary gears achieve a new peak in performance due to the extreme precision—the extraordinary techniques developed in heat treatment—the control of every step in production, from the billet to the finished gear. They offer manufacturers of any type of equipment maximum strength with minimum weight—the advantages of compactness and low noise level. They permit operation at extremely high speeds.

. . . . Foote Bros. "A-Q" Gears may offer your engineers a solution to the problems they face.

. . . . Foote Bros. high-quality Commercial Gears are backed by complete facilities and nearly a century of gear manufacturing experience.

. . . . Foote Bros. Actuators and Power Units provide a new approach to power control on aircraft or on machinery where designers face unique problems in control.

. . . . Foote Bros. Speed Reducers offer a wide range of sizes and ratios, in both worm and helical, to meet any reduction requirements.

Regardless of what you require in power transmission, call on Foote Bros.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. AVN, 4545 S. Western Ave, Chicago 9, Ill.

This planetary transmission produced at Foote Bros. for the Piasecki Helicopter Corporation transmits power from the Pratt & Whitney engine to drive the two giant rotors. The characteristics of high speed, compactness, high efficiency and low noise level are assured by the "A-Q" (aircraft quality) Gears which turn the rotor shaft. Two of these units are required for each Helicopter.

* * *

FOOTE BROS.

Better Power Transmission Through Better Gears

Three engineering bulletins are available to assist your engineers. They are: (1) "Whatever Your Needs in Quality Gears"; (2) "Aircraft Quality Gears" and (3) "Foote Bros. Power Units." If you have not received copies, write for them.